



SRI VENKATESWARA UNIVERSITY

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2.6.1. The institution has stated learning outcomes (generic and programme specific)/graduate attributes which are integrated into the assessment process and widely publicized through the website and other documents

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2021-2022

SVU COLLEGE OF ARTS

1. Adult & Continuing Education

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	MAAE -1.1	Alternative Learning Systems	2021	1.Remembrance of different forms of learning. 2.Application of different technology support services for effective learning. 3.Organization and administration of nonformal education programmes. 4.Evaluation of nonformal education programmes.
2	MAAE-1.2	Policy Studies In Adult/Continuing Education	2021	1. Identify the socio-political movements during pre-independence period for the promotion of literacy. 2.Analyze the trends of adult education programmes during post-independence period from social education to saakshar Bharat Mission. 3.Describe the National and International organizations efforts for the promotion of literacy at various levels. 4.Ex plain the State & Central Govt policies on adult education and special reference to literacy, post-literacy and continuing education.
3	MAAE-1.3	Adult Psychology And Learning	2021	1: Acquire knowledge on psychological foundations and its relevance to Adult Education and Learners. 2: Learn classification of motives and motivation techniques to motivate the Adult Learner. 3: Compare the Adult Personality & Child personality based on three Domain principles. 4: Examine the Adult Learning characteristics and theories of learning, eventually he/she will apply all aspects in adult class room activity.

4	MAAE-1.4	Socio-Philosophical Foundations Of Adult Education	2021	<ol style="list-style-type: none"> 1. Create thinking capacity to survive in the present society with philosophical approach. 2. Know great eminent leaders biography, sacrifices their lives for society. 3. Aware Dalit movement, women movement, co-operative movement in society especially rural areas. 4. Examine the problems of society with reference to bonded labor, child labour, untouchability, transgender and provide awareness on human rights.
5	MAAE-1.5	Communication Methods in Adult Education	2021	<ol style="list-style-type: none"> 1. Remembering the concept and methods of communication and their application to adult Education 2. Identifying different models of communication. 3. Describing the media of communication and their utility in continuing education. 4. Realising the use of different Audio-visual aids in teaching learning process.
6	MAAE-1.6	Human Values And Professional Ethics-I	2021	<ol style="list-style-type: none"> 1. Know the importance of professional ethics and to implement the ethical values in various professions. 2. Understand about the Good and bad values and to analyze the basic moral concepts. 3. Inculcate the students in the aspects of pursharthas . 4. Know different crimes and its impact on personal and social life and theories of punishment
7	MAAE-2.1	Recent Trends In Adult And Continuing Education	2021	<ol style="list-style-type: none"> 1. Identify the variations of literacy growth among States and Nation with reference to gender, rural and urban. 2. Recognize the functions, activities of JSS and Saakshar Bharat Mission, to promote Life Long learning. 3. Understand the five-year plan period programmes in terms of literacy, non-formal and functional literacy. 4. Examine the significance of the extension activities as third dimension of literacy programmes at field level.
8	MAAE-2.2	Curriculum And Methods Of Literacy Teaching	2021	<ol style="list-style-type: none"> 1. Remembering the meaning, foundations and theories of curriculum development with reference to adult learners. 2. Distinguishing different principles and approaches of curriculum development.

				<ol style="list-style-type: none"> 1. Interpreting the needs and interests of lifelong learners. 2. Executing to evaluate Adult Education programmes
9	MAAE-2.3	Research Methods In Adult Education	2021	<ol style="list-style-type: none"> 1. Understanding the concepts and methods of research. 2. Adopting the suitable sampling methods for research studies. 3. Developing tools for research studies. 4. Ability of research report writing.
10	MAAE-2.4	Field Work & Practical Assignments	2021	<ol style="list-style-type: none"> 1. Application of knowledge and skills in project designing 2. Ability to do research work. 3. Finding solutions to the problems identified in his research work. 4. Preparing the research report.
11	MAAE-2.5	Management Of Adult/Continuing Education	2021	<ol style="list-style-type: none"> 1. Know the principles of Management, Planning and Organizing capacity to conduct Adult Education Programmes. 2. Develop Social and Communication Skills to organize village, Mandal, District, State and Central level programmes. 3. Acquire project techniques for sustainable programmes. 4. Learn and enhance research skills to write project report, monitoring and evaluation of data of Adult Education Programme.
12	MAAE-2.6	Human Values And Professional Ethics-Ii	2021	<p>Understand and recognize the importance of Value Education & Human Values and also try to follow the traditional values of family, women and elders in the society.</p> <p>2: Examine code of ethics for medical and health care professionals. They Can sensitize the rural people on Health Issues & Problems.</p>

				<p>3: Explain the Environmental Protection and relationship between Man and Nature, causes of pollution and impact on environmental health.</p> <p>4: Recognize the need of Social ethics and fight against the anti-social activities, Organ trade, Human trafficking etc.</p>
13	MAAE-3.1	Training In Adult And Continuing Education	2021	<ol style="list-style-type: none"> 1. Identify the importance of training in Adult and Continuing Education programmes and differences between training and education. 2. Know the training methods, training materials to organize the Adult and Continuing Education programmes. 3. Follow the teaching methods like Lecture, discussion, demonstration and Role Play methods. 4. Recognize training facilities at different levels like National, State, District and Local.
14	MAAE-3.2	Comparative Studies In Adult Education	2021	<p>1: Compare the Adult Education Programmes of different countries based on its aims and significance.</p> <p>2: Compare and contrast of Adult Education movement and progress in different countries like UK, USA, Denmark etc with reference to India.</p> <p>3: Find out the similarities and dissimilarities of Adult Education Programs in selected countries.</p> <p>4: Identify the problems of Adult Education in terms of Planning, Organization and Budget activities in developing countries and India.</p>
15	MAAE-3.3	Material Development For Adult And Continuing Education	2021	<ol style="list-style-type: none"> 1. Identify the significance of learning materials in Adult Education classes. 2. Design the teaching learning activity objectives for better performance of Teacher educator in Adult Education Programmes. 3. Enhance language forms and competence and tune with the needs of the learner. 4. Develop teaching learning materials for self-learning
16	MAAE-3.4a	Peoples' participation And Development	2021	<ol style="list-style-type: none"> 1. Analysing the role and functions of people committees, 2. Understanding the functions of Panchayat Raj institutions.

				<ol style="list-style-type: none"> 3. Knowledge on the role of co-operatives in rural development. 4. Ability to catalyse the performance of PRIs and co-operatives.
17	MAAE-3.4b	Vocational Education And Skill Development	2021	<ol style="list-style-type: none"> 1. Identify the relationships of Vocational Education and Adults development. 2. Understand the institution training importance and its practices in vocational training. 3. Identify the issues of Rural Vocational training in India and Asian Countries. 4. Provide Vocational Guidance and Counselling for Adult trainees.
18	MAAE-3.4c	Guidance And Counselling In Adult And Continuing Education	2021	<ol style="list-style-type: none"> 1. Remembering the concept and theories and perspectives of guidance and counselling in educational process. 2. Recollecting understanding and analysis of educational problems of a clientele group. 3. Knowing the roles and functions of guidance counsellor. 4. Analysing the use of computers and internet in guidance and counselling.
19	MAAE-4.1	Monitoring And Evaluation	2021	<ol style="list-style-type: none"> 1. Identify the concept of monitoring and monitoring systems in adult education 2. Describe the different evaluation models. 3. Demonstrate the tools and techniques of evaluation. 4. Understand the importance of learner evaluation.
20	MAAE-4.2	Human Resource Development And Management In Lifelong Learning	2021	<ol style="list-style-type: none"> 1. Understand the importance of human resource development and its historical background. 2. Analyze the human capital and its functions in Adult Education. 3. Explain the cost benefit process and problems of measurements. 4. Identify the need of planning in human resource

				development and relation to Adult Education.
21	MAAE-4.3a	Environment And Education	2021	<p>1.Understand the fundamental aspects of environment and need of environmental protection.</p> <p>2: Interpret the environmental crisis with reference to pollutions and its impact of human life need of Environmental Conservation.</p> <p>3: Know the environmental laws and role of individual and community to Control environmental pollution.</p> <p>4: Explain Ecology and eco factors for Ecological Balance.</p>
22	MAAE-4.3d	Population Education	2021	<ol style="list-style-type: none"> 1. Recollecting the concepts, needs and importance of population related terminologies. 2. Analysing the causes and consequences of population growth. 3. Distinguishing the roles of different agencies in promotion of population education and control. 4. Identifying the different National population policies and influences fertility, mortality and migration.
23	MAAE-4.4	Dissertation / Project Work	2021	<p>Application of knowledge and skills in project designing</p> <p>2.Ability to do research work.</p> <p>3.Finding solutions to the problems identified in his research work.</p> <p>4.Preparing the research report.</p>

2. Ancient Indian History, Cultural Archeology

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
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1	AIHC&A-101	History of Ancient India upto 550 A.D.	2021	Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto 550 C.E. Student will also be well versed with different analytical approaches and models of interpretation.
2	AIHC&A-102	History of India from 1206 A.D. to 1526 A.D.	2021	<input type="checkbox"/> Students can familiarize in understanding the continuity with changes in all spheres of history and culture under the Delhi sultanates. <input type="checkbox"/> Students can able to assess the contribution of sultanates to Indian culture and impact of Islamic institutions on Indian culture
3	AIHC&A-103	History of Andhrasupto 1323 A.D.	2021	<input type="checkbox"/> <input type="checkbox"/> The study of comprehensive history of the country is incomplete without the study of regional history. <input type="checkbox"/> <input type="checkbox"/> Regional history is becoming more and more popular, for it has inherit potential of tapping varied kinds of sources for understanding the divergent aspects of local heritage and culture. <input type="checkbox"/> <input type="checkbox"/> The students can develop thorough understanding on Ancient Andhra history and culture.
4	AIHC&A-104	Ancient World Civilizations.	2021	<input type="checkbox"/> <input type="checkbox"/> Students gain familiarity with the rise and characteristic features of the ancient world Civilizations, its regional extent and variation. <input type="checkbox"/> <input type="checkbox"/> Students can understand the glory of the civilizations, the nature of its cities and material remains and institutions.

5	AIHC&A-105	(A) Principles and Methods of Archaeology.	2021	<input type="checkbox"/> Students can develop a strong foundation on the basic understanding of the nature, fundamentals, development and value of archaeology as a discipline. <input type="checkbox"/> Familiarized with basic descriptive technique and preliminary study of various categories of objects and the practical methods of doing Archaeological work.
6	AIHC&A-105	(B) Advanced Archaeological Theory and Research Methodology	2021	<ul style="list-style-type: none"> ➤ The student will be able to understand the basic features of various theories and thoughts used in archaeological interpretations. ➤ They can formulate a research proposal and decide on appropriate materials and methods of analysis. ➤ They can present the findings and the process of conducting research in written and verbal formats
7	AIHC&A-106	Human Values and Professional Ethics-I.	2021	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. <input type="checkbox"/> <input type="checkbox"/> They inspire the fundamental goodness of human beings and society at large.
8	AIHC&A-201	History of India from 550 A.D to 1206 A.D.	2021	<input type="checkbox"/> <input type="checkbox"/> Students can develop comprehensive knowledge on political, social, economic, religious and cultural history of early medieval India , regional polities and its impact <input type="checkbox"/> <input type="checkbox"/> Can also able to understand the circumstances lead to the invasions of Arabs and foundation of Muslim rule in India

9	AIHC&A-202	History of Medieval India from 1526 A.D to 1707 A.D.	2021	<input type="checkbox"/> <input type="checkbox"/> Students can understand thoroughly the Mughal conquest of India, their rule and legacy. <input type="checkbox"/> <input type="checkbox"/> The study help the students to assess the achievements and contribution of Mughals to Indian history and culture
10	AIHC&A-203	(A) History of South India from 1323 A.D. to 1724 A.D.	2021	<input type="checkbox"/> <input type="checkbox"/> This course provides comprehensive knowledge on the last imperial political formation in South India and the history of Vijayanagara, Bahmani and contemporary pretty powers. <input type="checkbox"/> <input type="checkbox"/> It helps to understand with the context of polity, economy, culture, religious and ideological changes.
11	AIHC&A-203	(B)Pre and Proto Historics in India	2021	<input type="checkbox"/> <input type="checkbox"/> Students will develop a strong foundation and critical understanding of the pre-proto cultures of India and will be able to situate Indian materials within wider archaeological debates.
12	AIHC&A-204	Historical Archeology	2021	<input type="checkbox"/> <input type="checkbox"/> The students can understand thoroughly the nature of the historical archaeology and their importance in historical and cultural studies. <input type="checkbox"/> <input type="checkbox"/> Able to interpret and writing the history with the help of written records.
13	AIHC&A-205	Human Values and Proffesional Ethics-II	2021	<input type="checkbox"/> <input type="checkbox"/> Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. <input type="checkbox"/> <input type="checkbox"/> They inspire the fundamental goodness of human beings and society at large.

14	AIHC&A-301	Epigraphy	2021	<input type="checkbox"/> <input type="checkbox"/> Students will be able to understand the profession knowledge on decipher and read scripts; assess the date of inscriptions with the help of paleographic features. <input type="checkbox"/> <input type="checkbox"/> Able to understand the different languages used in inscriptions, interpret the inscription in its Political. Socio-economic and Religious context.
15	AIHC&A-302	History of Indian Architecture	2021	<input type="checkbox"/> <input type="checkbox"/> Students will able to understand the evolution of architecture in India and their transformation through the ages in their religious, regional and stylistic context. <input type="checkbox"/> <input type="checkbox"/> Can gain theoretical knowledge about the basic philosophy, fundamental aspects and multifaceted nature of Architecture.
16	AIHC&A-303	Historiography and Historical Method	2021	<input type="checkbox"/> <input type="checkbox"/> It provides a critical overview of one of the most dynamic areas of modern historical inquiry—global history. <input type="checkbox"/> <input type="checkbox"/> The students can familiarize with historical studies, the theories and methods used in the practice of history writing. <input type="checkbox"/> <input type="checkbox"/> Students also gain foundation knowledge on Historical Methods and fundamentals of research methodology.
17	AIHC&A-304	(A)History of Modern Andhra from 1724 AD to 1956AD	2021	<input type="checkbox"/> <input type="checkbox"/> The students can understand the history of Andhra as well the history of Hyderabad state under company and crown rule. <input type="checkbox"/> <input type="checkbox"/> Assess the role of Andhras in the freedom movement <input type="checkbox"/> <input type="checkbox"/> Acquire thorough knowledge on the causes and course of the movement of separate Andhra state , movement for formation of Andhra Pradesh

18	AIHC&A-304	(B)Social and Political Institutions in Ancient India	2021	<input type="checkbox"/> <input type="checkbox"/> Students get acquainted with various developmental phases of the Indian social institutions and their significance in human life and values <input type="checkbox"/> <input type="checkbox"/> It helps to understand the concepts of Political institutions in Ancient India and their significance.
19	AIHC&A-305	(A)Outlines of Indian History	2021	<input type="checkbox"/> <input type="checkbox"/> The non history students as an external elective course become familiar in understanding the broad phases of Indian history and culture
20	AIHC&A-401	History of Indian Art	2021	<input type="checkbox"/> <input type="checkbox"/> Students become familiar with the monuments and their sculptures, art forms, features, styles and art schools of India during the period covered in the course.
21	AIHC&A -402	Numismatics	2021	<input type="checkbox"/> <input type="checkbox"/> Students will be able to identify and decipher the coins. <input type="checkbox"/> <input type="checkbox"/> They will also be able to understand the socio-political background that accure through the coinage of that time; thus getting holistic picture of economic and monetary system prevalent in ancient and medieval India.
22	AIHC&A-403	Historical Application in Tourism	2021	<input type="checkbox"/> <input type="checkbox"/> The students can familiarize the knowledge needed to excel in tourism activities. <input type="checkbox"/> <input type="checkbox"/> It will equip the students with the solid foundation to build upon the fundamentals, useful skills and expertise that can assist employment in Tourism Industry

23	AIHC&A-404	(A) Museology	2021	<input type="checkbox"/> <input type="checkbox"/> Students can learn the basic nature, functions of museums and their activities. <input type="checkbox"/> <input type="checkbox"/> The students were able to acquire the essential skills and knowledge needed for Museum profession.
24	AIHC&A-404	(B) Indias Early Cultural Contacts with other Countries	2021	<input type="checkbox"/> <input type="checkbox"/> Cross regional cultural diffusion has been an important aspect of historical evolution. A strong and vibrating civilization having its impact felt upon other contemporary cultures has been a common phenomenon of history. <input type="checkbox"/> <input type="checkbox"/> Student can understand well India's early cultural contacts and its influence in South East Asia, Central Asia, Persia, Indo-China Greece and Rome
25	AIHC&A-405	(A) Introduction to Indian Archeology	2021	<input type="checkbox"/> <input type="checkbox"/> The external elective students can acquire the knowledge about the importance of archeological studies, its relevance to other sciences. <input type="checkbox"/> <input type="checkbox"/> Will become familiar to understand the importance of epigraphy and numismatics in the reconstruction of history

3. Area Studies Programme

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SE-101	Early Cultural History of Southeast Asia	2021	<p>The Programme on Southeast Asian and Pacific Studies (SEAPS) will enrich the students largely related to geographical, historical, political, economic, social and strategic engagement of India with the states of Southeast Asian and South Pacific countries.</p> <p>Educate the students with interdisciplinary outlook and multidisciplinary engagement on Southeast Asian region.</p>

2	SE-102	Regional Geography of Southeast Asia	2021	<p>Comprehensive understanding of Southeast Asian and Pacific region through multidisciplinary approach</p> <p>Educate the students with interdisciplinary outlook and multidisciplinary engagement on Southeast Asian region.</p>
3	SE-103	Colonization of Southeast Asia	2021	<p>Students will have adequate knowledge on rise and fall of Portuguese</p> <p>Students differentiate the colonial powers that ruled Southeast Asia</p>
4	SE-104	Ancient Indian History up to 1206 A.D.	2021	<p>Students comprehend ancient Indian History, Indus Valley Civilization, Vedic Culture and Jainism and Buddhism.</p> <p>Know the rise of different Dynasties and contribution to Indian Culture.</p>
5	SE-105a	Modern European History, 1870-1991	2021	<p>Differentiate volatile political situation in Europe</p> <p>Earn broad understanding of Bismarck and consolidation of the Germany.</p>
6	SE-105b	History of Indian Constitution, 1773- 1947	2021	<p>Students learn different stages of national movement</p> <p>Gain full understanding of the Mahatma Gandhi</p> <p>Learn the contributions and sacrifices of the various national leaders</p>
7	SE-105c	Indian National Movements	2021	<p>Students comprehend the importance of acts in government</p> <p>Gain knowledge on the Indian Independence Act of 1935</p> <p>Know the salient features of Indian Constitution</p>
8	SE - 106a	Medieval Indian History 1206 A.D.–1707 A.D	2021	<p>Students will gain knowledge on Major dynasties of Medieval India</p> <p>Students know the great Indian rulers of Medieval period</p> <p>Students comprehend the advent of Europeans</p>
9	SE-106b	History of Asian and African Nationalism	2021	<p>Know the changing trends in Nationalist movements</p> <p>Students understand the nationalist movements in Southeast Asia</p> <p>Learn about the nationalist movements in Africa</p>

10	SE-201	Contemporary Cultural History of Southeast Asia	2021	<p>Students list the Christian Missionary activities in Southeast Asian countries.</p> <p>Knows the factors of Indian Emigration, and Chinese economic contribution in Southeast Asia.</p> <p>Comprehensive grasp over different cultures and religions in Southeast Asia</p>
11	SE-202	Modern History of China 1839-1976	2021	<p>Students know Western contacts, rebellions and reforms in China</p> <p>Advanced understanding on Sun Yat Sen, Chiang Kai-Shek and Mao Tse-Tung</p> <p>Distinguish Reconstruction and Consolidation of China and its foreign relations</p>
12	SE-203	Regional Geography of South Pacific and East Asia	2021	<p>Students identify physical setting, landforms, climate and soils of South Pacific.</p> <p>Comprehend on Australia, New Zealand, Japan and China</p> <p>Recognize the economic trends in South Pacific and East Asian nations</p>
13	SE-204	Nationalism in Southeast Asia	2021	<p>Understand causes for the rise of nationalism and movements in different Southeast Asian countries.</p> <p>Earn knowledge on the Japanese Occupation of Southeast Asia during the Second World War</p>
14	SE-205a	Modern Indian History 1757-1965	2021	<p>Students understand Indian sub-Continent and the Europeans arrival.</p> <p>Students distinguish the causes for the rise of nationalism and various phases of Independence movement.</p>
15	SE-205b	Indian Foreign Policy	2021	<p>Learn the dynamics of Indian foreign policy</p> <p>Earn broad understanding on Indian foreign relations</p> <p>Understand India in the SAARC</p>
16	SE-205c	International Organisations	2021	<p>Learn about necessity of International Organisations.</p> <p>Earn broad understanding of Bismarck and consolidation of the Germany.</p> <p>Understand global politics in the two world wars and the cold war</p>

17	SE-206a	History of USA from 1789 - 1900	2021	<p>Learn about American war of Independence</p> <p>Develop knowledge on the roles of Presidents of the USA</p> <p>Learn the causes for the Civil War, Abraham Lincoln and era of American Imperialism.</p>
18	SE-206a	International Relations	2021	<p>Students know the meaning, nature and scope of International Relations.</p> <p>Gain knowledge on the Cold War and New International Economic Order.</p> <p>Acquainted with the foreign policies of various countries; and learn about League of Nations and UNO.</p>
19	SE-301	Southeast Asia and World Politics	2021	<p>Students learn about the different political regimes in Southeast Asian nations.</p> <p>Comprehend on the contemporary political and economic conditions in Southeast Asian countries</p>
20	SE-302	Indochina Cambodia, Laos and Vietnam (1802-2000)	2021	<p>Students will learn early Western contacts and establishments of French protectorates over Indochina states.</p> <p>Gain knowledge on French Administration and freedom movements in Indochina.</p>
21	SE-303a	Modern History of Japan 1854-1975	2021	<p>Knows Japan's militarization, Russo Japanese war and the First World War</p> <p>Gain knowledge on US Occupation of Japan and Post World War-II developments and Japanese foreign relations.</p>
22	SE-303b	East Asian Development in the Post Cold War	2021	<p>Comprehend on the disintegration of Soviet Union and Emergence of New World Order.</p> <p>Ability to analyze security concerns in the post Cold War and perceptions of China, Japan and North Korea.</p>
23	SE-303c	Indian Diaspora	2021	<p>Know the reasons of Indian migration to Southeast Asian countries.</p> <p>Learn Indian migrant's socio-economic contribution to host nations.</p>

24	SE-303c	Research Methodology	2021	Students will be able to distinguish the difference between primary and secondary source. Will be in a position to make use of various sources available for his or her research work.
25	SE-303d	Research Methodology	2021	Develop understanding on Area Studies and other disciplines. Gain knowledge on the history of certain geographical area.
26	304	Skills and approaches in Understanding Area Studies	2021	Develop understanding on Area Studies and other disciplines. Gain knowledge on the history of certain geographical area. Learn the skills of distinguishing social, economic and politics with other areas.
26	SE-305a	India and the World	2021	Develop understanding of Non-Aligned Policy under Jawaharlal Nehru and Indira Gandhi Build knowledge on India's Role in the United Nations
27	SE-305b	Emerging Asia and the World	2021	Develop understanding of Economic and Social Progress in Asia and also Economic crisis and Recovery of Asia Comprehensive grasp over Foreign Direct Investments in Asia, Rise of China and also about India's Look East Policy.
28	SE-401	Regional Cooperation in Southeast Asia	2021	Students learn about early organizations like ASA, SEATO and MAPHILINDO. Develop understanding on the evolution of ASEAN from 5 to 10 members Focus on the ASEAN Summit Meetings, ARF and AFTA.
29	SE-402	Economic Landscape of Asia-Pacific	2021	Develop an understanding of the rise of industrial economies like Singapore, Malaysia, Thailand and Indonesia. Comprehend of the economies of Australia and New Zealand.
30	SE-403a	Post Cold War World Order	2021	Students gain knowledge on Globalization and Multi National Companies.

				Differentiate Regional and Multilateral Cooperation and the roles of ASEAN and SAARC.
31	SE-403b	Ethnicity And Social Transformation In Contemporary Southeast Asia And Australia	2021	Students understand archeology of South Pacific and settlement patterns Understand the European Colonization and Socio-Economic transformation Learn basic features of Australia, New Zealand and Fiji Societies and Multiculturalism.
32	SE-403c	Developing Blue Economy	2021	Acquainted with the Blue Economy, Marine Governance and Ocean Technologies. Gain knowledge on ports and shipping, oceanic resources and marine bio-technology. Develop an understanding on Renewable Ocean Energy and its Importance.
33	SE-403d	Energy, Environment and Sustainable Development	2021	Develop an understanding of the Types of energy sources in the world and India Learn about environment issues and emerging green technologies. Know the need of Renewable Energy, Green Energy, Bio-Diversity and eco systems.
34	SE-404	Project: Dissertation+Viva	2021	Explain the results of their project. Learn in detail on the broad knowledge of their topic Students leave their suggestions for the development of tourism in the country.
35	SE-405a	India – Australia Relations	2021	Learn about Littoral States of Indian Ocean and Complementarities between India-Australia Ability to analyze Political Issues and security concerns of both nations.
36	SE-405b	India and the Asia - Pacific	2021	Students understand major international developments happened after the Cold War Gain knowledge on the Indian foreign policy changes with Southeast

				and East Asia
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Tourism:

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	T-101	Theoretical Concepts Of Tourism	2021	Develop the ability to know the functions and obligations of different Tourism organizations Student will also learn about the noted international travel agencies
2	T-102	Tourism Principles And Practices	2021	Student will also learn about Tourism industry and its forms Gain knowledge on the Tourism policy models and Tourism Organizations
3	T-103	Travel And Tourism	2021	To know the Tourism Regulations in detailed. To learn the importance of transport in Tourism Understands the importance of travel Document
4	T-104	Art, Architecture And Tourism	2021	Comprehend on the important schools of Art and Architecture evolved in India. Students will learn Evolution and developments of Indian Architecture from ancient to Modern period.
5	T-105a	Historical Perspectives Of Tourism	2021	Comprehensive grasp over the Tourism development in the Country Students also learn the Tourism policies and organizations in the country
6	T-105b	Socio-Economic Dimensions Of Tourism	2021	To comprehend on the global changes and their economic roles Gain knowledge on socio-economic development through tourism

				Comprehend on the environmental conservation
7	T-105c	International Tourism And Unesco Sites In India	2021	Students know changing trends in International tourism and in India Gain knowledge on the UNESCO Heritage sites Categorize important UNESCO tourism sites.
8	T - 106a	Tourism Products	2021	To know the concept of tourism products Students learn about the roles of major tourism products in India Identify different kinds of tourism destinations
9	T-106b	Transport Management	2021	Students will learn different Modes of Transport and understand transport linkages to Tourism Gain knowledge on the importance of manpower in Transport Business Comprehend the students how Transport Management is essential in Tourism.
10	T-201	Tourism And Geography	2021	Students will learn relationship between Geography and Tourism. Gain knowledge on the use of map reading and other tools Gain knowledge on the influence of geography on Tourism.
11	T-202	Indian Cultural And Heritage Tourism	2021	Understand the importance of unique Indian Heritage architecture of different religions Students will be in a position to distinguish between different art forms in India.
12	T-203	Rural And Urban	2021	To understand, analyse and evaluate the importance of Rural and Urban Tourism

		Tourism		Students will be able to learn the need of infrastructure and economic benefits
13	T-204	Ecotourism	2021	Students will be in a position to assess the importance of Ecology in tourism sector. To make them realize how community based tourism is conducted
14	T-205a	Health And Medical Tourism	2021	Students comprehend on the various Medical Treatments available in India and strategy to attract Global medical Tourists. Learn the role of government and private sectors in promotion of Medical Tourism
15	T-205b	Virtual And E-Tourism	2021	To familiarize with digital tourism business concept. Students will understand emerging business models in E- tourism. Students would have cognizance of E-business and its strategies.
16	T-205c	Airline Ticketing And Information Management	2021	Comprehend on the necessary Travel services in Air travel Student will also learn the use of gadgets and information technology in Tourism
17	T-206a	Travel Agency And Tour Operations Management	2021	Gain the skill of Itinerary preparation and Tour formulation process. Comprehend the functions of a travel agency and Rules and Regulations of the agency approval besides domestic travel operators
18	T-206b	Tour Packages And Itinerary Planning	2021	Students will gain techniques in finance management and execution of Itinerary planning familiar with the techniques and approaches for successful destinations visits.
19	T-301	Tourism Management	2021	Students Demonstrate managerial skills and to manage the Tourism

				environment To comprehend on the financial management based on the market environment
20	T-302	Emerging Trends In Tourism	2021	Student will also learn the Socio, Economic and Environmental impacts of tourism. To learn Tourism related laws, responsibilities and different acts related to tourism..
21	T-303a	Environment, Sustainable Development And Tourism	2021	Enables Students to learn the importance of environment in tourism Know about the different environmental declaration
22	T-303b	Tourism Research Methods	2021	Students will able to learn the skills of report writing and questionnaire design. Evaluate the difference between qualitative and quantitative methods
23	T-303c	Tourism And Human Resource Management	2021	Students know the Human resources policies, functions and importance. Student will also learn the skills of HRM challenges and opportunities.
24	T-303d	Conservation And Management In Tourism	2021	Students know about conservation, preservation, restoration and management Understand the role of Conservation organizations at national and international level
25	T- 304	Tourism Skills And Opportunities	2021	To demonstrate the learned skills on Tour commentary, destination interpretation and communication. Students gain knowledge on the problem solving methods like crisis management, Loss of documents and Law and order issues
26	T-305a	Tourism Industry In India	2021	Students learn about the growing hospitality, transport industries and their activities

				Students will know the public policies in strengthening the tourism sector
27	T-305b	Adventure Tourism	2021	<p>Students will learn the minimum standards to be followed in Adventure tourism in land based, water based and Aerial based activities</p> <p>Student gain knowledge on the Adventure Tourism Destinations in India and also Problems and Prospects of the sector</p>
28	T-401	Tourism Marketing	2021	<p>Students will learn about the concepts, market management in Tourism.</p> <p>To know different types of marketing strategies related to the tourism industry.</p> <p>To acquaint with the effective marketing skills for tourism industry.</p>
29	T-402	Planning And Development Of Tourism	2021	<p>Students comprehend the linkages with government and private sectors in Tourism</p> <p>Develop analytical views on policies of national governments and international bodies.</p>
30	T-403a	Tourism Entrepreneurship	2021	<p>Students will Identify various challenges and revival techniques relevant of enterprises.</p> <p>To gain knowledge on business strategies and diversifications in tourism</p>
31	T-403b	Tourism And Hospitality Management	2021	<p>Student will be in a position to distinguish between different types of accommodations in the hotel industry.</p> <p>Students will get familiar with the management techniques in the accommodation sector.</p>
32	T-403c	Understanding And Event Management	2021	<p>Students know the importance of MICE along with Event Planning, organizing and Marketing.</p> <p>Learn about customer care, marketing equipment and tools</p>

33	T-403d	Destination Planning And Marketing	2021	Students know the importance resource analysis and Destination marketing Students comprehend on the Destination promotions
34	T-404	Project: Dissertation+Viva	2021	Explain the results of their project. Learn in detail on the broad knowledge of their topic Students leave their suggestions for the development of tourism in the country.
35	T-405a	Globalization And Tourism	2021	Gain knowledge on the effects of Globalization and opportunities in Tourism Learn the skills to deal with different challenges like safety and security in the world
36	T-405b	Tourism Economics	2021	Students will learn the principles of Demand and Supply in Tourism chain Students will also understand how tourism helps to develop the global economy in general and Indian economy in particular.

4. Centre for Womens Studies

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
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1.	SVUWS 101	Introduction to Gender and Women's Studies	2021	<ul style="list-style-type: none"> • Provides unique skills and knowledge to the student's developing ability to identify women's and feminist activities and accomplishments – especially those that have conventionally been neglected -- across a variety of cultures and historical context • To pursue a career in counseling by demonstrating how human thoughts and behaviors are influenced by
2.	SVUWS 102	Principles of Management with Gender Lens	2021	<ul style="list-style-type: none"> • To sharpen students' ability in acquiring the management skills required in their own lives, at home and in work place; • To understand the issues involved in the management of different organizations. • To enable the students to plan and handle difficult situations in their life and in work places
3.	SVUWS 103	Gender, Patriarchy and Society	2021	<ul style="list-style-type: none"> • Create knowledge on workplace gender and power relations. • Provide skill on distribution of power by reinforcing and relying on gender roles.
4.	105(a)	Environment: Gender and Livelihood Challenges	2021	<ul style="list-style-type: none"> • Content supported to create green jobs and also helps indigenous and rural communities promote tourism and eco-business in ways that protect their cultural heritage, natural resources, ways of life and economic development
5.	105(b)	Social Process and Behavioral Issues: Gender Questions	2021	<ul style="list-style-type: none"> • Learned how humans behave and interact with one another. There are many positions in these fields, each offering a unique opportunity to work closely with people and help with behavioral issues, including mental illness
6.	105(c)	Education: Gender Achievements and Gaps	2021	<ul style="list-style-type: none"> • To create an awareness on the status of women's education • To appreciate the dimensions of gender education
7.	106(a)	Gender Sensitization and Training: Needs and Strategies	2021	<ul style="list-style-type: none"> • To create Gender sensitivity among the students in every part of life of a human being; • To impart knowledge on different methods of training to inculcate gender sensitivity among the students;

8.	106(b)	Communication, Soft Skills and Etiquette	2021	<ul style="list-style-type: none"> • Employability/ Skill development: Build impactful communication through proper body language.
9.	202	Health and Nutrition: Gender Analysis	2021	<ul style="list-style-type: none"> • To explore nutrition professionals' perspectives of employability skills, and knowledge and skills required in the NGO's and Industry to understand and work on the issues of Women and Child health, nutritional status.
10	203	NGO Management and Social Development	2021	<ul style="list-style-type: none"> • NGO Management trains individuals working in bookkeeping, administration, raising money and operations in an NGO. • Enhance skills on different NGO jobs like
11	205(b)	Gender Identity and Leadership: Needs and Strategies	2021	<ul style="list-style-type: none"> • Provides knowledge about social process and cultural understanding. It also develops a clear and precise conceptual clarity on gender and leadership.
12	206 (a)	Human Rights with Gender Lens	2021	<ul style="list-style-type: none"> • To impart the knowledge to the students on the inalienable aspects of human life viz., Human Rights and their evolution over the period of time; • To enhance the awareness on the international initiatives
13	206(b)	Financial Literacy and Management	2021	<ul style="list-style-type: none"> • To present the underlying framework and concepts of Financial Management and Analyses in the context of changing Financial Management and overall business environment in the contemporary society.
14	302	Research Methods and Statistics: Feminist Concerns	2021	<ul style="list-style-type: none"> • This course equip students with a variety of different skills necessary to undertake and present feminist research at postgraduate level and to gain an understanding of key methodological, epistemological,
15	303(a)	Capacity Building and Leadership: Gender Questions	2021	<ul style="list-style-type: none"> • Acquire skills to Coordinate and organize training courses and workshops for various functionaries of line departments and other stakeholders/ agencies. • This course entrust tasks related to training, capacity
16	303(b)	Guidance and Counseling with Gender Perspectives	2021	<ul style="list-style-type: none"> • To provide the students with sound technical knowledge on guidance; • To develop the capacity of the students to tackle the problems that they may encounter during the course of their

17	303(c)	Human Resource Management : Gender Analysis	2021	<ul style="list-style-type: none"> • To provide the conceptual and theoretical knowledge on Human Resources; • To train the students in the Management of Human Resources;
18	303(d)	Women, Science and Technology: Gender Biases and Strategies	2021	<ul style="list-style-type: none"> • To inculcate ‘Scientific Temper’ among the students; • To understand how science and technology would assist women for their development; • To evaluate whether the science and technology would
19	304	Computer Applications and Software Packages for Data Analysis	2021	<ul style="list-style-type: none"> • Apply basic skills for care and maintenance of computer and train as Professional in E-Office management. • To train the students to do their works such as document processing, data entry, data analysis, database
20	305(a)	Social Values and Ethics : Gender Concerns	2021	<ul style="list-style-type: none"> • To understand the family values and ethics • To know about family structures and family dynamics • To develop a theoretical understanding of families and children
21	305(b)	Governance: Gender Issues and Challenges.	2021	<ul style="list-style-type: none"> • To impart knowledge to the students on the need for and current status of women’s participation in politics and administration; • To enable the students to understand the Women and
22	401	Entrepreneurship Development: Gender Analysis	2021	<ul style="list-style-type: none"> • To provide the theoretical and conceptual knowledge on Entrepreneurship; • To provide the knowledge about the procedures involved in the organization of new enterprises;
23	402	Women’s Legislations – Gender Concerns	2021	<ul style="list-style-type: none"> • To enable the students to understand the constitutional and legal provisions; • To sensitize the society about legal rights of women and to encourage women’s effective participation in the society;
24	403(a)	Participatory Learning, Methods and Extension Education	2021	<ul style="list-style-type: none"> • To understand the changing concept of extension, objectives and functions of Extension; a • To expose the students to outreach programmes to interact with the community;
25	403(b)	Social Structure: Gender Biases and Questions	2021	<ul style="list-style-type: none"> • To create awareness among the students on historical evolution of social institutions; • To analyze the Social Construction and Hierarchy, Family to State, Industrial revolution;

26	403(c)	Women's Health: A Life Cycle Approach	2021	<ul style="list-style-type: none"> • To acquire knowledge on physiological processes of one's own life; • To create an awareness regarding proper age of marriage, reproduction and the consequences early adolescent
27	403(d)	Globalization: Gender Implications	2021	<ul style="list-style-type: none"> • To create awareness among the students on the ongoing process of globalization; • To analyze the impact of globalization on feminization of labour force, low wages and Income gender inequalities;
28	405(a)	Media and Communication: Gender Concerns	2021	<ul style="list-style-type: none"> • To expose the students on the Feminist Theories of Mass Communication; • To create awareness among students how women are portrayed in movies, television and print media;
29	405(b)	Women and Work: Gender Questions	2021	<ul style="list-style-type: none"> • To understand the concepts of work and work participation and workforce participation levels in India; • To familiarize with the theoretical knowledge about segregation in labour market and its impact;

6 ECONOMETRICS:

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	EMT 101	Microeconomic Theory I	2021	<ul style="list-style-type: none"> • The microeconomic theory is to analyze how individual decision-makers, both consumers and producers, behave in a variety of economic environments. • The common goal in all of these issues is to identify the incentives of the various participating agents and the trade-offs that they face. • Microeconomics is a branch of economics that studies the behavior of individuals and firms in making decisions regarding the allocation of scarce resources and the interactions among these individuals and firms. • Microeconomics shows conditions under which free markets lead to desirable allocations. • The fundamental concepts of supply and demand, rational choice, efficiency, opportunity costs, incentives, production, profits, competition, monopoly, externalities, and public goods will help you to understand the world around you.

2	EMT 102	MacroeconomicTheoryI	2021	<ul style="list-style-type: none"> • Define and explain the process of calculating national income, identify its components, demonstrate circular flow of income, analyse the various income identities with government and international trade, define the concept of green accounting. • Understand Say's law of market, classical theory of employment and Keynes objection to the classical theory, demonstrate the principle of effective demand and income determination. • Explain the meaning of consumption function, relationship between APC and MPC, consumption and income, concept of multiplier and analyse the theories of absolute and relative income hypotheses. • Understand the relationship between investment and savings, demonstrate investment multiplier, and understand the meaning of MEC and MEI. CO5. Illustrate the meaning of interest, analyse the various theories of interest • The goals are supported by objectives such as minimizing unemployment, increasing productivity, controlling inflation, and more. The macro economy of a country is affected by many forces, and as such, economic indicators are invaluable to assessing different aspects of performance
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3	EMT 103	Mathematical Methods	2021	<ul style="list-style-type: none"> • Formulate mathematical models describing the dynamics of economic systems. Demonstrate the role of quantitative techniques in the field of business/industry, illustrate different types of equations, solve equations and system of equations, understand the concept of sets, illustrate and apply basic set operations. • Explain the rules for calculating derivatives, uses and application in calculating inter-relationship among total, marginal and average cost and revenue, calculate maxima, minima, elasticity, decide the optimal level of production for a firm. • Demonstrate the rules for calculating integration, describe the importance and application of integration in consumers' and producers' surpluses, total revenue and cost. • Illustrate matrix operation, minors, cofactors, use cofactor method to find inverse of a matrix, use Cramer's rule to solve systems of equations. • Students will get to learn applications of mathematical tools to economy.
4	EMT 104	Practical I	2021	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 Able to find Inverse of a Matrix, System of Simultaneous Linear Equations and Cramer's Rule method.</p> <p>CO5 Student can identify the relationship between the economic variables and test their significance which is key factor for economic analysis and policy making or business decisions.</p>

5	EMT 105	StatisticalMethods	2021	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis.</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 formulate Statistical Methods describing the dynamics of economic systems such as production function analysis and solve econometric analysis of underlying data use with knowledge advanced econometric tools and techniques can solve easily.</p> <p>CO5 Student can identify the relationship between the economic variables and test their significance which is key factor for economic analysis and policy making or business decisions.</p>
6	EMT 106	HumanValuesandProfessiona lEthics–I	2021	
7	EMT 201	MicroeconomicTheoryII	2021	<p>Course Objectives: The microeconomic theory is to analyze how individual decision-makers, both consumers and producers, behave in a variety of economic environments. The factor prices</p>
8	EMT 202	MacroeconomicTheoryII	2021	<p>CO1 The overarching goals of macroeconomics are to maximize the standard of living and achieve stable economic growth</p> <p>CO2 The goals are supported by objectives such as minimizing unemployment, increasing productivity, controlling inflation, and more.</p> <p>CO3 The macro economy of a country is affected by many forces, and as such, economic indicators are invaluable to assessing different aspects of performance.</p> <p>CO4 Meaning and Types of Inflation – Demand-Pull inflation – Cost-Push Inflation – The Phillips curve – The Inflation – Unemployment trade-off.</p> <p>CO5 Objectives of Macroeconomic policies – Objectives of Monetary policy.New-classical and Real Business cycles Theorem – Post-Keynesians - Implications for Stabilization Policies.</p>

9	EMT 203	BasicEconometrics	2021	<p>CO1 Adequate competency in the frontier areas of economic theory and methods.</p> <p>CO2 Formulation and estimation of a multiple regression model.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all models</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Estimation of system of equations, estimation of panel data models, generalized method of moments, discrete response models, censored regression models and estimation of average treatment effects.</p>
10	EMT 204	Practical II	2021	<p>CO1 Students can Identify Inter industrial relationships using Input-output analysis,</p> <p>CO2 analyse maximization of profits and minimization of costs can evaluate using Linear Programming,</p> <p>CO3 Analyse relationship of economic variables using simple and multiple regression models which are covered in basic Econometrics</p> <p>CO4 Able to estimate and interpret linear regression models and be able to distinguish between economic and statistical importance</p> <p>CO5 They should be able to critique reported regression results in applied academic papers and interpret the results for someone who is not trained as an economist.</p>

11	EMT 205	MathematicalEconomics	2021	<p>CO1 Students can deal Mathematical calculation of static optimization, Application of Lagrange's method and also student can evaluate Differential Equations and with Economic Applications.</p> <p>CO2 Able to estimate and interpret Inter industrial relationships using Input-output analysis, also analyse maximization of profits and minimization of costs of the firms using Linear Programming method</p> <p>CO3 Economic Applications of Differential Equations – Dynamic Multiplier – Harrod-Domar Model.</p> <p>CO4 Homogeneous Linear Difference Equations with Constant Coefficients – Particular Solution of Non-homogeneous Linear Equations – Linear First Order and Second Order Difference Equations with constant coefficients – Cobweb Model –Market model with Stocks</p> <p>CO5 Formulation of LPP – Basic and Feasible Solutions – Graphical Solution - Simplex Method – Duality in Linear Programming – Elements of Data envelop Analysis and its Applications.</p>
12	EMT 206	HumanValuesandProfessi onalEthicsII	2021	

13	EMT 301	<i>Indian Economy</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources. Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will be aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, make in India etc</p> <p>CO4 Students will get benefit about various economic issues at local, national and global level.</p> <p>CO5 Grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.</p>
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14	EMT 302	<i>EconomicsofInsurance</i>	2021	<p>CourseOutcomes:Attheendofthecourse,thestudentwillbeableto</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development seminars, internships, and/or a practicums in insurance and risk management.</p> <p>CO5 Examine the role of public policy including social insurance in personal financial planning and risk management.</p>
15	EMT 303	<i>AdvancedEconometrics</i>	2021	<p>CourseOutcomes:Attheendofthecourse,thestudentwillbeableto</p> <p>CO1 Concepts of Heteroscedasticity&Multicollinearity• Possible reasons behind the presence of Heteroscedasticity&Multicollinearity. Skill to judge the reliability of estimation in case of violation of basic assumptions for the application of ordinary linear regression method.</p> <p>CO2 Concepts of Autocorrelation reasons behind the presence of Heteroscedasticity&Multicollinearity. Describe the variance/covariance matrix for the regression errors under the assumption that the errors are correlated</p> <p>CO3 Apply modern econometric methods covering time series analysis, financial econometrics, microeconometrics, macroeconometrics and structural econometric modelling;</p> <p>CO4 Interpret and critically evaluate applied economics research literature; demonstrate programming skills and numerical methods; and</p> <p>CO5 Apply methods learned to address policy and business decision questions.</p>

16	EMT 304	<i>Computer Applications and Data Analysis</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will get basic knowledge of computers i.e., block diagram, evolution of computer, input/output devices, storing information in computer etc.</p> <p>CO2 At the end of this course student will gain Examine spreadsheet concepts and explore the Microsoft Office Excel environment. Import and export data.</p> <p>CO3 Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas. Perform analysis tasks using Data analysis pack</p> <p>CO4 Student gained and evaluate Econometric Methods such as OLS, LPM, Logistic regression analyses and conclude using SPSS Package</p> <p>CO5 Finally, student will be able to write programme for Simple statistical analyse and interpret through R-programming.</p>
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17	EMT 305	<i>Public Finance</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Understand the sources of finance both public and private, demonstrate the role of government to correct market failures and possible advantage of public financing</p> <p>CO2 Attain the advantages and knowledge of public investments and other government expenditures. Understand the causes of growing public expenditures for various programmes and policies within and outside the country.</p> <p>CO3 Understand the possible burden, benefits and distribution of various types of taxes among various classes of people, know the general trend and impact on general welfare and arouse them to suggest good and bad tax system.</p> <p>CO4 Understand the needs of public borrowing from all possible sources to meet necessary public investment/expenditures. Also be alerted to find sources for repayment</p> <p>CO5 Deliver effectively the preparation of budget and how they are passed in the house. Understand the changes in size and flexibility of state and central budget along with the role played by Finance Commission.</p>
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18	EMT 306	<i>Financial Institutions and Markets</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Explain the broad features of Indian financial institutions with its apex banks' objectives and purview. Also understand the instruments to control credit in the country.</p> <p>CO2 Effectively narrate the kinds and components of money with its regulatory system, be aware of the functions, objectives and limitations of commercial banks.</p> <p>CO3 Identify the existence and development of non-banking financial institutions, know the important role of Mutual funds, LIC, investment companies etc., utilize and effectively participate in the development process.</p> <p>CO4 Understand the conditions of financial markets and its impact in the economy</p> <p>CO5 Demonstrate the role and significance of foreign exchange rate and its markets with its impact on various sectors in the economy.</p>
19	EMT 307	<i>Practical III</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Student will gain Examine spreadsheet. Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas.</p> <p>CO2 Perform analysis tasks using Data analysis pack using MS-Excel.</p> <p>CO3 Student gained and evaluate Econometric Methods such as OLS, LPM, Logistic regression analyse and conclude using SPSS Package</p> <p>CO4 Student will able to test of Multicollinearity, Heteroscedasticity and Autocorrelation.</p> <p>CO5 Student will be able to write programme for Simple statistical analyse and interpret through R-programming.</p>

20	EMT 308	Introduction to Econometrics	2021	<p>CO1 students will have adequate competency in the frontier areas of economic theory and methods</p> <p>CO2 Use basic econometric estimation techniques such as Ordinary Least Squares to estimate bivariate and multivariate regression models.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all model.</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Students will acquire additional specialization topics are estimation of system of equations, estimation of panel data models, generalized method of moments, discrete response models, censored regression models and estimation of average treatment effects.</p>
21	EMT 309	Indian Economy	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources. Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, make in India etc</p> <p>CO4 Students will get benefit about various economic issues at local, national and global level.</p> <p>CO5 Grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.</p>

22	EMT 310	EconomicsofInsurance	2021	<p>CourseOutcomes:Attheendofthecourse, thestudentwillbeableto</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development seminars, internships, and/or a practicums in insurance and risk management.</p> <p>CO5 Examine the role of public policy including social insurance in personal financial planning and risk management.</p>
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23	EMT 401	<i>International Trade and Finance</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Identify the basic difference between inter-regional and international trade, understand how international trade has helped countries to acquire goods at cheaper cost and explain it through the various international trade theories.</p> <p>CO2 Show the benefits of international trade in a way how nations with strong international trade have become prosperous and have the power to control world economy and how global trade can be one of the major contributors of reducing poverty.</p> <p>CO3 Explain how restrictions to international trade would limit a nation in the services and goods produced within its territories and at the same time explain that a rise in international trade is essential for the growth of globalization.</p> <p>CO4 Show the importance of maintaining equilibrium in the balance of payments and suggests suitable measures to correct disequilibrium as well.</p> <p>CO5 Be aware of the changes in the composition as well as direction of foreign trade after international trade and know the causes and effects of deficits in the balance of payments, measures adopted to correct the deficits and identify the need for having trade reforms.</p>
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24	EMT 402	<i>Environmental Economics</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Realize the importance and influence of environment on the economy including the quality of manpower. Arouse their feelings to make cleaner environment so as to achieve harmonious development.</p> <p>CO2 Understand that environmental problem is not the problem of a single country or region but a global problem/issue. Hence, policy formulation may be for all countries.</p> <p>CO3 Demonstrate the scientific management of waste materials; realize the role and importance of individuals to keep the environment clean.</p> <p>CO4 Understand the causes and victims of environmental pollution like poverty, population explosion, and over-use of resources, careless or unscientific dump/management of wastes.</p> <p>CO5 Suggest appropriate measures to correct environmental degradation, aware of those ingredients such as healthy climate, quality of human beings, domestic and other natural habitats and biodiversity levels, productivity and productions, sustainability, etc are all influenced by environment.</p>
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25	EMT 403	<i>Applied Econometrics</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Student will be able to develop a sound understanding of the core microeconomic concepts that economists use to understand the process of decision-making by an economic agent(s).</p> <p>CO2 The student should be able to apply mathematical tools and techniques to study behaviour of economic agents.</p> <p>CO3 Students will be able to identify strategic behaviour of economic agents and formulate them in a game theoretic framework.</p> <p>CO4 Student can explore Macro econometric models; Klein-Goldberger Model for USA, Agarwal, K. Krishna Murthy and N.V. A. Narasimhan Models.</p> <p>CO5 To gain knowledge in Applications of Single and Simultaneous Equation Models for macroeconomic variables.</p>
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26	EMT 404	<i>Optimization Techniques in Economics</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Knowledge of several models will enhance the applicability of the knowledge to actual data solving and getting appropriate conclusions.</p> <p>CO2 Be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.</p> <p>CO3 This course will sharpen the quantitative skills of a student and help them understand applications of Operations research in varied fields like manufacturing, Finance, purchasing and procurement, assigning and allocation of resources for optimum result.</p> <p>CO4 Be able to design new simple models, like: CPM, PERT to improve decision –making and develop critical thinking and objective analysis of decision problems.</p> <p>CO5 Students will be able to identify and develop operational research models from verbal description of real system.</p>
27	EMT 405	<i>Time Series Econometrics</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will acquire additional specialization through the Time series Econometrics Analysis.</p> <p>CO2 Skill to judge the reliability of estimation in case of Stationarity and Non-Stationarity test, Co-integration test.</p> <p>CO3 Forecasting with a single-equation linear regression model, and Forecasting with a multi-equation econometric model</p> <p>CO4 Student can evaluate Univariate Time Series Models like MA, AR, ARMA and ARIMA models.</p> <p>CO5 Student will be able to calculate VAR model which most important in macro-economic models.</p>

28	EMT 406	<i>Practical IV Environmental Economics</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Able to get application knowledge of statistical packages like SPSS, E-Views to apply economic data.</p> <p>CO2 At the end of this course student will gain practical knowledge of Time Series Analysis by using EViews.</p> <p>CO3 Student gained and evaluate Stationarity test by using ADF Test.</p> <p>CO4 After complete this course student will be able to test of Spurious Regression, Co-integration test and Granger Causality test.</p> <p>CO5 Finally, student will be able to make feasible solution in optimization.</p>
29	EMT 407	Project	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Knowledge of several models will enhance the applicability of the knowledge to actual data solving and getting appropriate conclusions.</p> <p>CO2 Be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.</p> <p>CO3 This course will sharpen the quantitative skills of a student and help them understand applications of Operations research in varied fields like manufacturing, Finance, purchasing and procurement, assigning and allocation of resources for optimum result.</p> <p>CO4 Be able to design new simple models, like: CPM, PERT to improve decision-making and develop critical thinking and objective analysis of decision problems.</p> <p>CO5 Students will be able to identify and develop operational research models from verbal description of real system.</p>

30	EMT 408	<i>Optimization Techniques in Economics</i>	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Knowledge of several models will enhance the applicability of the knowledge to actual data solving and getting appropriate conclusions.</p> <p>CO2 Be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.</p> <p>CO3 This course will sharpen the quantitative skills of a student and help them understand applications of Operations research in varied fields like manufacturing, Finance, purchasing and procurement, assigning and allocation of resources for optimum result.</p> <p>CO4 Be able to design new simple models, like: CPM, PERT to improve decision –making and develop critical thinking and objective analysis of decision problems.</p> <p>CO5 Students will be able to identify and develop operational research models from verbal description of real system.</p>
31	EMT 409	Data Base for the Indian Economy	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Develop ideas of the basic characteristics of Indian economy, its potential on natural resources</p> <p>CO2 Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO3 Students can be able to describe the knowledge or skills students should acquire by the end of a particular assignment, class, course, or program, and help students understand why that knowledge and those skills will be useful to them</p> <p>CO4 Creating new knowledge (Cognitive) Developing feelings and emotions (Affective) Enhancing physical and manual skills (Psychomotor).</p> <p>CO5 Students can also be scaffolded so that they continue to push student learning to new levels in any of these three categories.</p>

32	EMT 410	Actuarial Statistics	2021	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 To learn and gain the knowledge about the impact of economic and social conditions in the financial sector.</p> <p>CO2 To create awareness about the financial terminology and calculations in the policy designing</p> <p>CO3 To skill development and honed by successful actuaries include an excellent business communications in sense with knowledge of finance, accounting, and economics.</p> <p>CO4 Actuaries often required keen analytical and problem solving skills using mathematics and statistics.</p> <p>CO5 Actuaries can ability to work with reliability and relevance by using the analytical and scientific reports generated by the researchers</p>
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7. Economics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ECO-101 & 201	Micro Economics Analysis – I & II	2021-22	<ol style="list-style-type: none"> 1. Graduate Consulting Analyst. Graduate Recruitment Bureau. 2. Economic Consultant (Public Policy). 3. NERA Internship -Industry Research Analyst. Research Fellow. 4. Graduate Economic Consulting Internship, Economist, Customer Experience Strategy.
2	ECO-102 & 202	Macro Economics Analysis – I & II	2021-22	<ol style="list-style-type: none"> 1. Work for a central bank of financial institutions. 2. Work as a consultants. 3. work in banking sector.
3	ECO-103&203	Public economics & Federal Finance	2021-22	<ol style="list-style-type: none"> 1. Assistant commercial Tax Officers. 2. Industrial finance officers. 3. Bill collectors.
4	ECO-104&204	Mathematical Methods in Economics – 1 and Statistical Methods in Economics	2021-22	<ol style="list-style-type: none"> 1. Assistant Statistical officers. 2. Bossiness firm consultant. 3. Market research Analyst. 4. Financial analyst.

				5. Investment manager. 6. International trade specialist.
5	ECO 105(a)	Fundamentals of Computer	2021-22	1. Digital Assistants. 2. Office Computer operators.
6.	ECO 105(b)	Urban Economics	2021-22	1. Senior urban economist. 2. International urban Economist. 3. Senior program Research analyst. 4. Urban environmental impact officer.
7.	ECO 105(c)	Welfare Economics	2021-22	1. Policy maker. 2. Administrator. 3. Welfare officer in Sachivalyam. 4. Admin in Sachivalayam.
8.	ECO 106(a)	Economics of Environment	2021-22	1. Environmental pollution officer. 2. Environmental consultants. 3. Environmental pollution planning and consultants. 4. Environmental conservation / Advocacy.
9.	ECO 106(b)	Demography	2021-22	1. National Sample Survey officers. 2. Census Survey Officers. 3. Chief planning officers.
10.	ECO 107	Human Values and Professional Ethics -I	2021-22	1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
11	ECO 205(a)	International Trade: Theory and Policy	2021-22	1. International trading officers. 2. Export and import Officers. 3. Shares consultants. 4. Commercial desk manager. 5. Global trade Advisory.
12	ECO 205(b)	Economics of Infrastructure	2021-22	1. Analyst Infrastructure investment and associate. 2. Assistant director Infrastructure investment division. 3. Manager Infrastructure delivery.
13	ECO 205(c)	Introduction to Information	2021-22	1. Computer operator.

		Technology		<ol style="list-style-type: none"> 2. Programming officer. 3. Web designing. 4. Creation of application.
14	ECO 206(a)	Basic Econometrics	2021-22	<ol style="list-style-type: none"> 1. SAP Technology Consultant. 2. Market risk analyst.
15	ECO 206(b)	Economics of Tourism	2021-22	<ol style="list-style-type: none"> 1. Tourist guides. 2. Tourism development officers. 3. Adventure Guide. 4. Travel Consultants.
16	ECO 207	Human Values and Professional Ethics -II	2021-22	<ol style="list-style-type: none"> 1. Student will know the values of ethics in various fields including medical, social and business ethics. 2. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 3. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
17	ECO 301	Economics of Growth and Development	2021-22	<ol style="list-style-type: none"> 1. Project Coordinator. 2. Recreation manager. 3. Programme Director. 4. Social and community manager.
18	ECO 302	Indian Economy	2021-22	<ol style="list-style-type: none"> 1. NSSO. 2. Economic Survey directors.
19	ECO 303 (a)	International Finance	2021-22	<ol style="list-style-type: none"> 1. Financial Advisors. 2. Financial officers.
20	ECO 303 (b)	Production Economics and Farm Management	2021-22	<ol style="list-style-type: none"> 1. Farm Development mangers. 2. Marketing consultants. 3. Dairy development coordinators.
21	ECO 303 (c)	Industrial Economics	2021-22	<ol style="list-style-type: none"> 1. Industrial relation officers.
22	ECO 303 (d)	Women and Economic Development	2021-22	<ol style="list-style-type: none"> 1. Velugu community coordinators. 2. Mandal book Keepers. 3. Assistant project managers. 4. DRDA Coordinators.
23	ECO 304	Communication and Soft Skills	2021-22	<ol style="list-style-type: none"> 1. Skill development coordinators. 2. Public relation officers. 3. Marketing and Advertising. 4. Media. 5. Meeting and event planning.
24	ECO 305 (a)	Andhra Pradesh Economy	2021-22	<ol style="list-style-type: none"> 1. NSSO.

				2. AP Economy Survey Directors
25	ECO 305 (b)	Agricultural Economics	2021-22	1. Agricultural officers. 2. Agricultural field officers. 3. Banking field officers. 4. Agricultural product and marketing coordinators.
26	ECO 401	Rural Development	2021-22	1. MGNREGA Programme officers. 2. District Coordinators. 3. Institutional building officers.
27	ECO 402	Financial Institutions and Markets	2021-22	1. Corporate finance. 2. Financial planning officers.
28	ECO 403 (a)	India's Economic Reforms	2021-22	1. Planning & Development Officers
29	ECO 403 (b)	Entrepreneurship and Skill Development	2021-22	1. Business consultant. 2. Research and development. 3. Recruiter. 4. Sales managers.
30	ECO 403 (c)	Labour Economics	2021-22	1. Labour officers. 2. Labour relations officers. 3. Labour relations assistant. 4. Construction estimators
31	ECO 403 (d)	Economics of Insurance	2021-22	1. Insurance Agents. 2. Loan processor. 3. Loss control officers. 4. Risk managers.
32	ECO 404	Human Resource and Sustainable Development	2021-22	1. Human resource assistant. 2. Benefits administrator. 3. Training manager. 4. Compensation specialist. 5. Employee relations manager.
33	ECO 405 (a)	Human Resource Development	2021-22	1. Human resource recruiter. 2. Performance management and development. 3. Employees training officers. 4. Organizational development officers.
34	ECO 405 (b)	Planning in India and Indian Economy	2021-22	1. Municipality planning officers. 2. Planning coordinators.

10. English

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1)	101:	Poetry-I	2021	<ul style="list-style-type: none"> • An understanding of the evolution of English poetry across ages. • May inspire poetic creativity
2)	102:	Drama-I	2021	<ol style="list-style-type: none"> 1.Perceive the nuances of performance 2.Recognize the transformation of human experiences into dramatic experiences.
3)	103:	:Fiction-I	2021	<ol style="list-style-type: none"> 1. Aesthetic and literary merits of the novel 2. The conditions of the age and the influence
4)	104	:Prose-I	2021	<ol style="list-style-type: none"> 1. Understand the genre of essay 2. Imbibe the deeper human values implied in the essay.
5)	106:	Human Values and Professional Ethics-I	2021	<ol style="list-style-type: none"> 1. Realize the necessity of practicing Human values and Ethics in all walks of life including the profession they opt for 2. Understand Bhagvad Gita as a guide for modern lifestyle

6)	201	:Poetry-II	2021	Sensitizes the students on the classical and contemporary poetic ethos Raises student awareness on movements like Modernism, War Poetry, Women's poetry, Symbolism etc,
7)	202	:Drama-II	2021	
8)	203	:Fiction-II	2021	1. The great works of major novelist of modern age 2. The ability to understand the technique of the Novel
9)	204	:Prose-II	2021	After the completion of the course the students are able to 1. Know the working mechanism of Feminism and socialism 2. Know the mind and strategies of Victorian essayists 3. Know the importance of culture in the lives of Victorian people Know the importance of being human in their dealings with the fellow beings
10)	205:	English Language Teaching	2021	1. Understand the importance of language lab, teaching material and audio-visual aids in the learning and teaching of English. 2. Know to test and testing components of language tests examinations and evaluation procedures

11)	301	: Indian English Literature-I	2021	<ol style="list-style-type: none"> 1. Understand the Indian English writings and movements associated with it in India 2. Understand the merits of Indian English writings and drawbacks if any
12)	302:	American Literature-I	2021	<ol style="list-style-type: none"> 1. An idea of English literature in America 2. Familiarity with the literary movements 3. Knowledge about concepts like Puritanism, transcendentalism, symbolism, impressionism etc
13)	303:	Literary Criticism-I	2021	<p>Equips the student with the evolution of English Literary Criticism from Aristotle to early twentieth century</p> <p>Helps students map the genealogy of Western canonical critical texts</p>
14)	304 (A) 304(B): 304 (C): 305 (D):	:Comparative Literature Short Story Women's Writings Indian Literature in English	2021	<ol style="list-style-type: none"> 1. Understand national and world literatures and the need of comparative studies in the global world. 2. Understand the ways of comparative analysis <p>OUT COMES:</p> <p>Perceives creativity as a tool of empowerment and unity amongst women.</p> <p>Understand gendered spaces in creativity and the genealogy of women's writings like Indian, African American, French etc.</p>

15)	305 (A):	Communicative English	2021	<p>Understand the significance and importance of Communication in English in the present day world</p> <ol style="list-style-type: none"> 1. Understand communication process, the different types and barriers of communication
16)	305(B):	English for Media	2021	<ol style="list-style-type: none"> 1. Understand the use of language in different situations in writing for the media 2. Learn the oral skills necessary for media like interview skills
17)	305(C):	3An Introductory Course to Literature	2021	<ol style="list-style-type: none"> 3. Understand the use of language in different situations in writing for the media 4. Learn the oral skills necessary for media like interview skills
18)	401:	Indian English Literature-II	2021	<ol style="list-style-type: none"> 1. Understand the Indian English writings and movements associated with it in India 2. Understand the poetic features of Indian English poetry

19)	404(A): 404(B): 404(C): 404(D):	Translation: Theory and Practice Subaltern Studies Post-Colonial Literatures World Classics in English Translations	2021	1. Know the concepts of dalitism, feminism, marginalism and Subaltern aspects with relevant theories 2. Appreciate and understand the struggles and sorrows of subalterns
20)	405(A): 405(B): 405(C):	Soft Skills Indian Literature in English Translation Contemporary Translation Studies	2021	1. Will learn about morals and responsibilities 2. Learn to acquire the enduring values embedded in the great literary works of our writers

11. Linguistics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	LING:101	Phonetics	2021	1. Understand the process of Communication and speech production, Classification and four procedures of speech production. 2. Analyze production of consonants and vowels. 3. Understand expressing secondary and double articulations and prosodic features.
2	LING:102	Phonology	2021	1. Understand concept of Phoneme, Principals

				of Phonemic analysis and discovery procedures. 2 .Analyze phonemes, Phonological systems and procedures of phonemics. 3. Analyze basic units of Phonology and concept of redundancy.
3	LING:103	Morphology	2021	1. Analyze Morpheme, classification and types of morphemes 2. Analyze derivation, inflection, different models of grammatical description and Morpho-Phonemics 3. Express Intermediate constituents, types of constructions and Idioms
4	LING:104	Syntax	2021	1. Understand assumptions about language, components of grammar and sentence constituents 2. Analyze Phase structure rules, X-bar Notation and grammatical transformations 3. Understand categorical, sub-categorical information and selectional restrictions
5	LING:105	(A)Language & Linguistics	2021	1. Understand notions of language and Approaches to the study of languages 2. Analyze structure of language and grammatical analysis. 3. Understand Linguistics and other fields
6	LING:105	(B)Semantics	2021	1. Understand Nature and Scope of Semantics and types of meaning 2. Analyze lexical structure and Meaning and sentence structure and meaning 3. Understand Lexical context of Meaning and Theories of Meaning
7	LING:105	(C)Structure of Language (Telugu/English)	2021	1. Understand characteristics of language(Telugu/English) 2. Understand Phonology and Morpho-phonemics in language(Telugu/English)

				3. Understand Morphology and Syntax of language (Telugu/English)
8	LING:106	(A)Human Relations	2021	<ol style="list-style-type: none"> 1. .To understand the introduction of Human Relations 2. 2. To Analyze factors effecting Human Relations and Human Relations Skills 3. 3. To understand Human Relations theory of management and industrial relations.
9	LING:106	(B)Insructional Technology	2021	<ol style="list-style-type: none"> 1.Understand introduction of IT and types of IT in class room 2. Analyze IT in Teaching and Learning and improvement of IT learning process 3.Understand IT in Educational Platforms
10	LING:107	Human Values & Proffessional Ethics I	2021	<ol style="list-style-type: none"> 1.Understand Ethics and its relation and Ethical values. 2.Understand Nature of values and individual Society 3.Understand Bhagavad Gita, Buddhism, Jainism etc., and crime and theories of punishment
11	LING:201	Historical Linguistics	2021	<ol style="list-style-type: none"> 1. Understand the major breakthroughs in historical Linguistics 2. Understand sound change ,Linguistics change and Semantic change 3. Analyses Internal reconstruction ,comparative method and Glottochronology
12	LING:202	Dialectology	2021	<ol style="list-style-type: none"> 1. Understand the terms of Dialectology, history and development of dialect studies 2. Analyze types of dialects and variability 3. Understand dialect survey methodology and its approaches
13	LING:203	Field Linguistics	2021	<ol style="list-style-type: none"> 1. Understand scope and purpose of field linguistics and problems of investigating non- literary languages 2. Understand techniques and methods of elicitation and collection of Linguistic data 3. Analyze the collection, recording and processing of data.

14	LING:204	Language Families of India and Comparative Dravidian	2021	<ol style="list-style-type: none"> 1. Understand language families of India 2. Analyze Dravidian Language Family and history and sources of each Dravidian Language. 3. Analyze vocalic, consonant and Sandhi systems, and reconstruction of Dravidian.
15	LING:205	(A) Language Contact	2021	<ol style="list-style-type: none"> 1. Analyze speech as social interaction and Interference 2. Analyze Indian language contact situation and effects of language contact 3. Understand Linguistic borrowing
16	LING:205	(B) Natural Language Processing	2021	<ol style="list-style-type: none"> 1. Understand rationalist and empiricist approaches to language. 2. Analyze Mathematical Foundations, essential information theory and Entropy. 3. Analyze Tagging, Taggers, probabilistic parsing and clustering.
17	LING:205	(C) Endangered Languages	2021	<ol style="list-style-type: none"> 1. Understand scope of Endangered Language 2. Understand reasons for Endangerment of languages and effects of Endangerment 3. Analyze criteria and Endangered Languages of India
18	LING:206	(A) Literacy, Language Curriculum Testing	2021	<ol style="list-style-type: none"> 1. Analyze literacy as communication skill 2. Understand language acquisition and survey of language learning theories of 3. Understand material for adult literacy and language testing
19	LING:206	(B) Communication Technology	2021	<ol style="list-style-type: none"> 1. Analyze communication theory and Linguistic communication 2. Understand Artificial Intelligence, Machine Translation and Micro planner artificial languages 3. Analyze corpus based approach, Natural Language Processing and technological advances in Communication.
20	LING:207	Human Values & Professional Ethics II	2021	<ol style="list-style-type: none"> 1. Understand value education and human values

				<p>2. Understand effectiveness to capability Medical and Business Ethics</p> <p>2. Understand environmental and social ethics</p>
21	LING:301	Language Acquisition & Child Language Development	2021	<p>1. Analyze language acquisition device and stages of language acquisition</p> <p>2. Understand continuity and discontinuity approaches</p> <p>3. Analyze the acquisition process and acquisition VS learning</p>
22	LING:302	Language Disorders and Speech Pathology	2021	<p>1. Understand disordered communication, language and the brain</p> <p>2. Understand articulation, language and hearing disorders</p> <p>3. Understand speech pathology</p>
23	LING:303	(A)Socio Linguistics	2021	<p>1. Analyze language and society, Linguistic variability and language varieties</p> <p>2. Analyze Sociology of language planning and Language and Social identity</p> <p>3. Understand Sociolinguistic Methodology</p>
24	LING:303	(B)Psycho Linguistics	2021	<p>1. Understand an overview of Psycho-linguistics</p> <p>2. Analyze speech production, perception, and comprehension.</p> <p>3. Understand lexical processing , concept of meaning, bilingualism and language acquisition in children</p>
25	LING:303	(C)Neuro Linguistics	2021	<p>1. Understand of anatomy of brain and language and speech</p> <p>2. Understand History of Neuro-linguistics</p> <p>3. Analyze speech and language disorders and testing techniques</p>
26	LING:303	(D)Computational Linguistics	2021	<p>1. Understand Computational Phonetics , Phonemics, Morphology and Syntax</p> <p>2. Understand computational semantics and Lexicography</p> <p>3. Analyze application of computational linguistics</p>

27	LING:304	ICT for Enriching Teaching and Learning Skills	2021	<ol style="list-style-type: none"> 1. Understand the concepts, importance and scope of ICT 2. Analyze computer networking and ICT enriched teaching & learning experiences. 3. Understand online teaching and learning experiences.
28	LING:305	(A) Bilingualism	2021	<ol style="list-style-type: none"> 1. Understand speech as social interaction 2. Analyze theory, types and Measurement of Bilingualism 3. Understand Bilingual Education and Bilingualism and ethnocentrism
29	LING:305	(B) Mass Media Communication	2021	<ol style="list-style-type: none"> 1. Understand nature, Scope and Types of communication 2. Analyze communication process and models of communication 3. Understand theory of communication and Multimedia Technology
30	LING:401	Language Universals & Linguistic Typology	2021	<ol style="list-style-type: none"> 1. Analyze language universals and its role of universals in linguistic theory. 2. Understand linguistic typology as a principle of classification. 3. Analyze language families of South Asia, South Asia as a Linguistic area and selected areal features of South Indian languages.
31	LING:402	Research Methodology	2021	<ol style="list-style-type: none"> 1. Understand purpose, scope, methods and tools of research 2. Understand problem identification, methods of study and scientific methods in field work of research 3. Analyze research work convert to PDF
32	LING:403	(A) Lexicography	2021	<ol style="list-style-type: none"> 1. Understand lexicology and lexicography, notation and format, planning and organization. 2. Analyze types, number and size of dictionaries. 3. Understand dictionary making

33	LING:403	(B)Language Teaching	2021	<ol style="list-style-type: none"> 1. Analyze role of Linguistics in language teaching and Methods of language teaching. 2. Analyze language acquisition and second language learning and cognitive models of language learning/teaching. 3. Understand teaching aids, remedial teaching material and computer aide language teaching
34	LING:403	(C)Language Planning	2021	<ol style="list-style-type: none"> 1. Understand Nature and Scope of language planning and communication technology 2. Analyze process and problems of language planning 3. Understand types and treatment of language planning
35	LING:404	(D)Translation	2021	<ol style="list-style-type: none"> 1. Understand the concept of translation 2. Understand principles and analysis of translation 3. Solve the exercises of translation
36	LING:404	Multy-disciplinary Capacity Building	2021	<ol style="list-style-type: none"> 1. Understand Health and Environmental and Social Safety Studies 2. Analyze Physical and Health Education Studies 3. Understand Work Experience and Art Education
37	LING:405	(A)Branches of Linguistics	2021	<ol style="list-style-type: none"> 1. Analyze Language and Linguistics, branches of Linguistics, speech organs. 2. Understand Phonology, Morphology, Syntax, and semantics. 3. Understand types of Interdisciplinary Linguistics and Branches of Applied Linguistic
38	LING:405	(B)Dictionary Making	2021	<ol style="list-style-type: none"> 1. Understand types of dictionaries 2. Analyze Monolingual Dictionary Making 3. Analyze Bilingual Dictionary Making.

12. Hindi

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Sahitya ka Itihas	2021	<ol style="list-style-type: none"> 1. The tradition of writing history of Hindi literature along with determining the time division of Hindi literature will get the knowledge of the background of the particular period of literature. 2. The origin and traditional development of the Bhakti literature and its trends and movements of particular period. 3. The development of ancient literary traditions in medieval poetry in the level of language, expressions and human kindness. 4. The form of devotional literature and achievement of the writers and philosophers in the Bhakti movements at national level.
2	102	Pracheen Evam Madhya Kaleen Kavya	2021	<ol style="list-style-type: none"> 1. Student will get information about ancient literature with especial study of Chandbardai, Vidyapati and Ameer Khusro. 2. Student will get the knowledge of the poetry of Kabeer, Tulasi, Jaysi and Surdash in medical Hindi literature under the background of Bhakti movement. 3. Student will get the knowledge of the poetry of Bihari and Ghananand in Post medieval Hindi literature. 4. Overall the student will get knowledge of ancient and medieval literature in the practical study with their social and philosophical era.
3	103	Aadunik Kavita	2021	<ol style="list-style-type: none"> 1. Student will know the reflexion of independent movement and renaissance of Indian society in modern poetry. 2. Student will be able to get knowledge of their characteristics by knowing the essence of the poems of pre independent poets. 3. Student will know the subject, theme, characters, literary forms along with the

				<p>development of Khari boli as the language of poetry.</p> <p>4. Knowing the movement of romanticism in Hindi literature, theme of the poetry, love of the nature, feeling of the mankind and society in their poems.</p>
4	104	Samkaleen Kavitha	2021	<p>1. Knowledge of the poems of progressive, experimental, new and contemporary trends of poetry in Hindi.</p> <p>2. Student will get the meaning of the poems of different poets and their poetry, especial context to modern period.</p> <p>3. Student will get the knowledge of new trends of Hindi poems and its issues express by the poets in different manner to understand their present time.</p> <p>4. Student will understand the contemporary poems, its subjects, characters, ideology, their activities, reflections and reactions.</p>
5	105	(A) Samsamyik Kavita	2021	<p>1. Knowledge of the poems of contemporary trends-progressive, experimental, new and contemporary trends of poetry in Hindi.</p> <p>2. Student will get the meaning of the poems of different poets and their poetry, especial context to contemporary period.</p> <p>3. Student will get the knowledge of new trends of Hindi poems and its issues express by Femanist, Dalit and Tribble poets in different manner to understand their present time.</p> <p>4. Student will understand the contemporary poems, its subjects, characters, ideology, their activities, reflections and reactions.</p>
6	105	(B) Sahityik Andolan	2021	<p>1. Student will get knowledge of Bhakti movement of medieval period in arts, culture and literature.</p> <p>2. Student will understand independent, romantic movement and its reflection in</p>

				<p>literature.</p> <p>3. Student will be able to get knowledge of progressive and janvadi movement in Hindi literature.</p> <p>4. Student will be get knowledge of Dalit, Tribal and Feminist movement in Indian society for democratic right to reformation and get equality in Indian society.</p>
7	105	(C) Sahitya Ki Vaichariki	2021	<p>1. Student will know the litrary traditions and modernity, renecienss and indipendent movement along with philosophy in Hindi literature.,</p> <p>2. Renecienss in Indian society especial reference to Hindi speaking states and development of khariboli in Bhartenduyuga and Divediyuga.</p> <p>3. Knowledge of various theories to understand the medievality and modernity, critical theory of history of literature and knowledge of historical materialistic development of philosophy.</p> <p>4. Student will get knowledge of organic evolutional philosophy with different ideologies to understand constitutional rights, democracy, socilism, Gandhism Ambekarism and feminism in Hindi literature.</p>
8	106	(A) BhashaVignan aur Hindi Bhasha	2021	<p>1. They will acquire the knowledge of definitions, types, divisions and braches of linguistics; understand the history of Indo-Aryan languages with origin and development of Hindi language.</p> <p>2. They know the background of development of linguistics and languages-like sociological, psychological, historical, cultural and ideological along with classification of Hindi sounds and knowledge of Hindi vocabulary.</p> <p>3. They will know the importance of language as</p>

				<p>communication source; understand the meanings, form and syntax, development of Hindi Pronouns and Devanagari script.</p> <p>4. They will understand the meaning of phonetics, directions of sound, nature of morphology, phonology and philosophy of language.</p>
9	106	(B) Patrakarita aur Jansanchar Madhyayam	2021	<p>1. They will get knowledge of the beginning of journalism and cultural development of Hindi journalism along with nature of mass media and the development of electronic media.</p> <p>2. Student will get the knowledge of independent journalism, genres of writing, concept of news and telecommunication, revolution of mechanical communication.</p> <p>3. They will know the general principles of editing, writing skills of journalism, fundamental rights and knowledge of electronic media.</p> <p>4. They will understand the working methods of mass media, development and importance of internet in world media in present scenario.</p>
10	107	Human values and Professional Ethics-I	2021	<p>1. Student will get knowledge nature of ethics and nature of values.</p> <p>2. Student gaining knowledge of the ahimsa, satya, brahamacharya.</p> <p>3. Student will get knowledge about Bhagvad Gita and Buddhism.</p> <p>4. Gaining knowledge of the crime and theories of punishment.</p>
11	201	Adhunik Sahitya Ka Itihas	2021	<p>1. There will get knowledge of various conditions of independent and renaissance era and the development of Hindi romanticism.</p> <p>2. Student will get knowledge of various trends of romanticism, progressivism and</p>

				<p>post colonial development of Hindi prose and its trends.</p> <p>3. Student will get knowledge of pre and post independent trends of poetry and prose like novel, stories, dramas, one act plays, essays and criticism in modern Hindi literature.</p> <p>4. Student will get knowledge with the development of traditions in modern era and their atmosphere, time, condition and directions in Hindi literature.</p>
12	202	Katha Sahitya	2021	<p>1. Student will be able to understand the Indian society by reading the major novel of Hindi.</p> <p>2. Student will be able to understand the various dimensions of human life depicted in the short stories of Hindi.</p> <p>3. Students will be able to know the socio-political, cultural problems and goodness by reading the characters depicted in Hindi short stories.</p> <p>4. Knowledge of socio-historical political background by reading the major characters of novels and short stories in Hindi.</p>
13	203	Natya Sahitya	2021	<p>1. Student will be able to understand the Indian society by reading the major play of Hindi.</p> <p>2. Student will be able to understand the various dimensions of human life depicted in the one act play of Hindi.</p> <p>3. Students will be able to know the socio-political, cultural problems and goodness by reading the characters depicted in Hindi one-act play.</p> <p>4. Knowledge of socio-historical political background by reading the major characters of drama and one act play in Hindi.</p>
14	204	Aalochana Sahitya	2021	<p>1. Knowledge of criticism of Hindi, its</p>

				<p>traditional base of development.</p> <p>2. Knowledge of criticism, its trends, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of criticism of Hindi writers, their trends, philosophical, critical and theoretical development in practical criticism and its values implemented by different critics.</p> <p>4. Importance of major critical trends and their critics, writing of criticism and their contribution in development of Hindi criticism.</p>
15	205	(A) Gadhya Sahitya	2021	<p>1. Knowledge of essays, autobiography of Hindi and its traditional base of development.</p> <p>2. Knowledge of essays, autobiography and its trends, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of essays, autobiography of Hindi writers and their trends, philosophical, theoretical development of essays, autobiography and its values implemented by different writers.</p> <p>4. Importance of essays, major autobiography, trends and contribution of their writers in development of Hindi essays and autobiography.</p>
16	205	(B) Anya Gadhya Sahitya	2021	<p>1. Knowledge of Hindi prose and its traditional base of development.</p> <p>2. Importance of prose, its trend, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of Hindi prose writers, their trends, philosophical and theoretical development of prose and its values implemented by different writers.</p> <p>4. Importance of major prose trends, their writers, writing of prose and their</p>

				contribution in development of Hindi prose.
17	205	(C) Andhra ka Hindi Sahitya	2021	<ol style="list-style-type: none"> 1. The tradition of writing Hindi literature by Hindi writers of Andhra along with determining the time division of Hindi literature and background of the periodical literature. 2. The origin and traditional development of Hindi literature by Hindi writers of Andhra and its trends. 3. The development of Hindi literature written by Hindi writers of Andhra, literary traditions in poetry and prose, development of Hindi language, expressions and human kindness by their writing in Hindi. 4. The form and achievement of the writings, philosophical, socialological and pshycological background of their literature and contribution in national level.
18	206	(A) Proyajana Mulak Hindi aur Rajbhasha	2021	<ol style="list-style-type: none"> 1. Knowledge of the various trends of Functional Hindi, Rajbhasha Hindi and its constitutional importance. 2. Knowledge of key elements of Functional Hindi and correspondence language of central and state government official work. 3. Student will get knowledge of correspondence and its types, official mailing, drafting, noting, corresponding types and its various forms in Functional Hindi. 4. Student will get knowledge of official language Hindi, personal administrative, and finance and public relations management in Hindi language, utility of Hindi language in official level, letter writing and using of technical vocabulary.
19	206	(B) Anuvad ke Sidhanth aur Prayog	2021	<ol style="list-style-type: none"> 1. Student will get to know of the form, process and methods of translation. 2. Student will gain the knowledge of types of

				<p>translation as well as problems of translation.</p> <p>3. Student will acquire the knowledge of translation tools and various branches of translation.</p> <p>4. Student will know the principle of construction, nature and importance of translation in practical.</p>
20	207	Human Values and Professional Ethics-II	2021	<p>1. Student will get knowledge of value education and medical ethics.</p> <p>2. Student will get knowledge of the business and environment ethics.</p> <p>3. Gaining knowledge of the social ethics.</p>
21	301	Bhartiya Kavya Shastra Ki Parampara	2021	<p>1. Knowledge of the Achary tradition of Sanskrit poetics and the main principles of poetry soul.</p> <p>2. Student will be familiar with the poetic theory of Sanskrit, Pali, Prakrit, Apabramsha and Hindi with their ideological trends of modern literary personalities.</p> <p>3. Knowledge of ideological thinking of poetry, as principals of poetics in ancient, medieval and modern period of post independence era.</p> <p>4. Knowledge of writings of poetics by Acharyas, poets in ancient and medieval period.</p>
22	302	Hindi Kavya Shastra Ka Vikash	2021	<p>1. Student will get knowledge of thinking of modern writers, about the creativity, its aspects, responsibilities of writers, values of writing.</p> <p>2. Student will known the contribution of writing and justification of creativities etc., by development of theoretical criticism in the base of modern ideological and philosophical.</p> <p>3. Student will get knowledge of poetic</p>

				<p>developed by great Acharyas of Hindi by their writings and ideological conceptual development of modern poetics.</p> <p>4. Student will be able to know the poetic development of pre independent and post colonial period ie romantic poets, thinkers, prograssive writers, contemporary poets and literary personalities.</p>
23	303	(A) Dalit Sahitya	2021	<p>1. Student will get to know the concept of dalit literature and literary movements, with philosophical base and its consciousness.</p> <p>2. Student will get knowledge with the characteristics of dalit literature, ideological strength and philosophical power.</p> <p>3. Student will get knowledge of traditional concept of dalit literature and the problems writing its own history.</p> <p>4. Student will get knowledge of dalit literature in different form, its writers and literary trends like novel, short stories drama, one act play and autobiography etc.</p>
24	303	(B) Adivasi Sahitya	2021	<p>1. Student will get knowledge with the concept of tribble literature and literary movements, philosophical base of tribble literature and its consciousness.</p> <p>2. Student will get knowledge with the characteristics of tribble literature i.e ideological strength and philosophical power.</p> <p>3. Student will get knowledge of traditional concept of tribble literature and the problems writing its own history.</p> <p>4. Student will get knowledge of tribble literature in different form, its writers and literary trends like novel, short stories drama, one act play and autobiography etc.</p>
25	303	(C) Narivadi Sahitya	2021	<p>1. Student will get the knowledge of nature of feminist thoughts and writings in Hindi.</p> <p>2. Student will get the knowledge of the various</p>

				<p>dimensions of feminist thoughts in Hindi.</p> <p>3. Student will get the knowledge of the position and direction of female personalities.</p> <p>4. Student will get an opportunity to understand the literature like poetry, prose, short stories, novels and autobiography of feminist writers.</p>
26	303	(D) Pravasi Sahitya	2021	<p>1. Student will get the knowledge of nature of NRI thoughts and writing skill in Hindi</p> <p>2. Student will get the knowledge of the various dimensions of NRI thought in Hindi.</p> <p>3. Student will get the knowledge of the position and direction of NRI personalities.</p> <p>4. Student will get an opportunity to understand the literature like poetry, prose, short stories, novels and autobiography of NRI writings in Hindi.</p>
27	304	Bhash Shikshan ke Sidhanta aur Proyog	2021	<p>1. Student will get the knowledge of forms, process and methods of language teaching.</p> <p>2. Student will gain the knowledge of types of language teaching as well as problems of the same.</p> <p>3. Student will acquire the knowledge of language teaching, tools and various branches of language teaching.</p> <p>4. Student will know the principle of construction, nature and importance of language teaching in practical.</p>
28	305	(A) Vyavaharik Hindi Vyakaram	2021	<p>1. Student will get the knowledge of nature and word wealth of Hindi language.</p> <p>2. Student will get the knowledge of the Devanagari scriupt, sound, vowels and consonants.</p> <p>3. Student will gain knowledge of the Hindi</p>

				sentence, gender, words, factor and meaning of Hindi tenses.
29	305	(B) Hindi Sahitya Ke Nirmatha	2021	<ol style="list-style-type: none"> 1. Student will get the knowledge of Ameer Khusro, Vidhayapati, Kabir, and Jayasi. 2. Student will learn about the medieval poets- Sur, Tulsi, Meera, Raskhan, Rahim, Bihari and importance of their poetries. 3. Student will be able to get the knowledge of ancient and medieval poets and poetry, especial reference to Bhakti movement. 4. Student will be able to get information regarding literary trends, developed in pre modern period.
30	401	Bharatiya Tulnatmak Sahitya	2021	<ol style="list-style-type: none"> 1. Student will get information about the comparative Indian literature, its concept and form of Indian literature and various stages of development. 2. Student will able to understand the problem of writing, devotional consciousness of comparative Indian literature with cultural features and influencing thoughts. 3. Knowledge of national independence movements, renaissance, romanticism, realism, progressivism and post colonial realistic consciousness reflected in comparative Indian literature. 4. In comparative Indian literature, the knowledge of democratic values, subaltern studies with their philosophy, movement of social reformation and identity in literature.
31	402	Paschatya Samiksha Shashtra	2021	<ol style="list-style-type: none"> 1. Student will get the knowledge of Plato's pre period and introduction to Greak thinkers. 2. Student will get the knowledge of western criticism from Plato to post modernist period. 3. Student will get an introduction to all types of

				<p>modern literary critical theories and thinkers.</p> <p>4. Student will get the knowledge of historical, philosophical development of western criticism by the different thinkers of various fields of knowledge and disciplines.</p>
32	403	(A) Anudit Bhartiya Sahitya	2021	<p>1. Student will get the information about translated Indian literature, its concept, form of Indian literature and various stages of development.</p> <p>2. Student will be able to understand the problem of writing, devotional consciousness of translated Indian literature with cultural features and influencing thoughts.</p> <p>3. Knowledge of national independent movements, renaissance, romanticism, realism, progressivism and post colonial realistic consciousness reflected in translated Indian literature.</p> <p>4. In translated Indian literature the knowledge of democratic values, subaltern studies, their philosophy, movement for social reformation and identity in literature.</p>
33	403	(B) Asmitamulak Sahitya Vimarsha	2021	<p>1. Knowledge of contemporary criticism of dalit, femanist and tribble literary trends.</p> <p>2. Knowledge of contemporary criticism, its tread, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of contemporary criticism of Hindi writers, their trends, philosophical and critical theoretical development, practical criticism and its values implemented by different critics.</p> <p>4. Knowledge of major critical trends, their critics, writing of criticism and their contribution in development of contemporary</p>

				<p>criticism. 1. Knowledge of contemporary criticism of dalit, femanist and trible literary trends.</p> <p>2. Knowledge of contemporary criticism, its tread, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of contemporary criticism of Hindi writers, their trends, philosophical and critical theoretical development, practical criticism and its values implemented by different critics.</p> <p>4. Knowledge of major critical trends, their critics, writing of criticism and their contribution in development of contemporary criticism.</p>
34	403	(C) Sahitya ka Tulanathmak Adhyayan	2021	<p>1. Student will get the knowledge of study of comparative literature with different methods, nature and problem of comparative literature and studies.</p> <p>2. Student will be able to know the study of comparative literature, research work and the role of translation etc.</p> <p>3. Student will gain the knowledge of comparative study of Hindi-Telugu literature.</p> <p>4. Student will get the knowledge of Hindi and Telugu literary trends and types of literature like novel, short stories, dramas, essays and subaltern studies of literature.</p>
35	403	(D) Anusandhan Ke Siddhanth aur Dristiya	2021	<p>1. Student will get the knowledge of nature, directions, types and methods of research like sociological, regional, textual, linguistic, poetics, comparative and psychological.</p> <p>2. Student will know the methods of selecting topic, collection of material, preparing of notes, writing and arrangement of thesis.</p> <p>3. Student will get the knowledge of interview, preparing of short notes, using of</p>

				<p>library, methods of preparing the notes, modification of thesis, editing, presenting, and writing of conclusion.</p> <p>4. Student will be able to know the using of critical theories in research of literature, logistical, linguist problems of research and searching the solutions in research.</p>
36	404	Antar Jananushasnatmak Drushtiya aur Pravidhiya	2021	<p>1. Student will know the poetics, spiritual, mythological, materialist, realist, romantics and views of study of literature.</p> <p>2. Student will be able to get Knowledge of sociological, historical, aesthetical and psychological vision of literature.</p> <p>3. Students will know about the new critical, modernist and post modernist, structural and post structural view of literature.</p> <p>4. Student will understand the linguistics, stylistics, comparative, democratic, Ambedkarist, feministic, colonial and post colonial, Gandhian and humanitarian view of literature.</p>
37	405	(A) Manak Hindi Aur Devnagari Lipi	2021	<p>1. Student will get the knowledge of Hindi forms, designs, vocabulary and sound composition and spelling problem.</p> <p>2. Student will get the knowledge of formation of terminology, to know the development and use of Devnagari script in practice.</p> <p>3. Student will know about the standard of Hindi, relation with grammar, use of Hindi language in oral and writing both levels.</p>
38	405	(B) Adhunik Hindi Sahitya Ke Nirmata	2021	<p>1. Student will get the knowledge of the writer of modern Hindi.</p> <p>2. Student will get the knowledge of the Hindi writers and their writings.</p> <p>3. Student will be able to know about different trends of literature with writers.</p>

13.History

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	History 101	HISTORY OF INDIA UPTO 650 A D	2021	<p>1.Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto 650 C.E.</p> <p>2.Student will also be well versed with different analytical approaches and models of interpretation.</p>
2	History 102.	: History of Indian Polity and Economy, 1206-1757	2021	<p>1. Discuss Indus Valley and Vedic Civilization</p> <p>2. Students will understand Polity and economy from the Mauryas to Pallavas</p> <p>3. Discuss Guptas, Chalukyas, Vakatakas.</p>
3	History 103	History of Modern India, 1757-1947	2021	<p>1. Discuss World between two World Wars pertaining to League of Nations, Great Depression, Nazism, and Fascism.</p> <p>2. Students will understand International Relations during 1919-39</p> <p>3. Discuss World War II and its impact</p>
4	History 104	History of Modern World, 1900-1945	2021	<p>1.Student can gain the knowledge on the history and consequences of the World between two World Wars pertaining to League of Nations, Great Depression, Nazism, and Fascism.</p> <p>2.Students will understand International Relations during 1919-39.</p> <p>3.Students can understand thoroughly about the Second World War and its impact.</p>

5	History 105	History of Andhras, Up to 1336 AD	2021	<ol style="list-style-type: none"> 1. Discuss Nature and Scope of Tourism 2. Will understand Elements of Tourism 3. Discuss Tourism Organization and Promotion
6	History 106a	Theoretical Concepts of Tourism	2021	<ol style="list-style-type: none"> 1.The students can gain fair understanding about the fundamentals of tourism and its basic concepts. 2.The students can acquire professional knowledge to get opportunity in tourism industry.
7	History 401	Historiography	2021	<ol style="list-style-type: none"> 1.It provides a critical overview of one of the most dynamic areas of modern historical inquiry—global history. 2.The students can familiarize with historical studies, approaches theories and methods used in the practice of history writing.
8	History 402	Contemporary History Of India - II	2021	<ol style="list-style-type: none"> 1.Students were able to understand the Functioning of Parliamentary Democracy in India 2.Acquire knowledge on Emergency and its Aftermath 3.Able to assess the significance of Economic Reforms since 1991
9	History 403a	International Relations And Organizations	2021	<ol style="list-style-type: none"> 1.Students can possess knowledge on the Concept of International Relations 2.Were able to understand Balance of Power 3.Can gain knowledge on International Organizations
10	History 403b	Constitutional History of India, 1773-1950		<ol style="list-style-type: none"> 1.The course helps the students to gain require knowledge on the enactment of various acts introduced by the British 2.Students will also understand the impact of the legislations, National Agitations and its Prospective.

11	History 403c	History of Modern Asia 1868-1960	2021	1.Students can possess knowledge on Japanese Imperialism. 2.Will understand Emergence of Modern Korea and Modern West Asia
12	History 403d	History of Modern Latin America	2021	1.Students will be identify struggles for Independence in Latin America 2.They will understand the politics of the Western Powers in Latin America..
13	History 404	History Of Science And Technology In India 1858-1947	2021	1.This paper will make the students to understand how far Science and Technology has progressed in India and resulted in bringing Socio-Economic changes in the Society.
14	History 405a	Outlines of Andhra History and Culture	2021	1.The study of comprehensive history of the country is incomplete without the study of regional history.The external discipline students can develop thorough understanding on Andhra history and culture.
15	History 405b	Health, Medicine And Society In Modern India	2021	1.Possess knowledge and awareness about the Public health 2.Able to understand the Western and Indigenous Medical systems.

Human Rights & Development

Scial Development

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1.	HR 101	Human Rights: Concepts and Theoretical Perspectives	2021	<ol style="list-style-type: none"> 1. To Expose the students about nature and concept of Human Rights. 2. To apprise the students about the Liberal. Marxian prerspectives. 3. To expose the students that alternative, third world and Indian Perspectives of Human Rights,
2.	HR 102	Human Rights in India the constitutional and Legal Framework	2021	<ol style="list-style-type: none"> 1. Students to know the Indian Constitution and Human Rights. 2. To understand the Judiciary and Human Rights. 3. To understand about Criminal Justice system in India.
3.	HR 103	Human Rights and Duties Education	2021	<ol style="list-style-type: none"> 1. To expose students about the importance of Human Rights and Duties education. 2. To apprise the students about the target groups for Human Rights <p>To expose the students about the content of Human Rights Education.</p>
4.	HR 104	Rights and the implementation Machinery	2021	<ol style="list-style-type: none"> 1. To expose the students about the implementation machineries at National Level and International Level. 2. The students understand about how the problems in Accessing Judice through Courts and Tribunals. 3. To expose the students that statutory bodies of

				Human Rights.
5.	HR 105 A	Working Class and Human Rights and Duties	2021	<ol style="list-style-type: none"> 1. To understand the students about the status of working class, concept and issues. 2. To expose the student about the basic rights and duties of various sections. 3. To understand the Indian Constitutional Frame work.
6.	HR 105 B	Human Rights Education, Teaching and Training	2021	<ol style="list-style-type: none"> 1. To expose the student about the origin, UNO and Human Rights education policies. 2. To apprise the students about the principles and practice in teaching of Human Rights Education. 3. To understand the student about training aspects of Human Rights.
7.	HR 106 A	Human Rights Activism and Role of NGOs	2021	<ol style="list-style-type: none"> 1. To expose the students about the different types of Human Rights Activisms. 2. To identify the student that the different Types of NGO's and their role for promoting the Human Rights.
8.	HR 106 B	Social Movements and Human Rights in India	2021	<ol style="list-style-type: none"> 1. To expose the students about the role of NGOs for protecting human rights. 2. To Understand the student about the Political Movements, Ecological and Environmental Movements of Human Rights. 3. To apprise the student about the various types of Social and Political Reforms of Human Rights.
9.	HR 107	Human Values and Professional Ethics - I	2021	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values. 2. To understand the student about nature of Values, Ahimsa and various religion theories.

				3. To assess the student about various Crime and Theories of punishments
10.	HR201	Human Rights and Indian Polity	2021	<ol style="list-style-type: none"> 1. To expose the students about the concept of basic structure of Indian Polity, administrative structure in India. 2. To apprise the student about the role of People's Agencies for protecting and promotion of human rights in India. 3. To understand the students about the Legislative Procedure and implementation process in India.
11.	HR202	Emerging Dimensions of Human Rights	2021	<ol style="list-style-type: none"> 1. To expose the students about the Human Rights and Duties of Non-State Armed Groups and Commercial Corporations. 2. To understand the students about the rights of future generation. 3. To apprise the students about the Human Rights and Changing Dimension of State Sovereignty and Humanitarian' Intervention.
12.	HR203	Human Rights: The International Context	2021	<ol style="list-style-type: none"> 1. To understand the students about the evolution of human rights and UN charter of human rights. 2. To expose the students about regional dimensions of human rights and special conventions on human rights. 3. To understand the students about International conventions on human rights and duties.
13.	HR204	Research Methodology, Statics and Computer Applications	2021	<ol style="list-style-type: none"> 1) Student to Know Scope of Social Research. 2) To Understand Data Analysis. 3) Understand About Types of Data Collections
14.	HR205 A	Human Rights – The Socio Economic Context	2021	<ol style="list-style-type: none"> 1. To expose the students about the socio, economic background of human rights.

				<ol style="list-style-type: none"> 2. To apprise the students about human rights of vulnerable groups. 3. To understand the students about the basic human need for development with respect to human rights.
15.	HR205 B	Societal Problems of Human Rights in India	2021	<ol style="list-style-type: none"> 1. To understand the student about the societal problems of human rights. 2. To understand the students about the social problems of minorities, scheduled caste and scheduled tribes. 3. To expose the students about Regionalism, terrorism.
16.	HR206 A	Human Rights and Criminal Justice System	2021	<ol style="list-style-type: none"> 1. To expose the students about Rights of Inmates of Prisons and Custodial Homes. 2. To understand the students about the Right to Legal Aid, Access to Justice and Speedy Justice. 3. To expose the students that the problems of human rights.
17.	HR207	Human Values and Professional Ethics - II	2021	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values. 2. To understand the student about nature of Values, Ahimsa and various religion theories. 3. To assess the student about various Crime and Theories of punishments.
18.	HR 301	Social Movements and Human Rights and Duties	2021	<ol style="list-style-type: none"> 1. To expose the student about conceptual perspectives of social movements and human rights. 2. To apprise the students about the social, political and religious reforms movements and human rights. 3. To expose the students that the role of International

				and National Institutions in promoting Human Rights.
19.	HR 302	Science, Technology, Human Rights and Duties	2021	<ol style="list-style-type: none"> 1. Understand the basic concept in science and technology and also about Indian perspective on science and technology. 2. Ability to know about the Right to Adequate Food, Agricultural, Biotechnology Impact of on Agriculture, Food Biotechnology and Revolution in Information Technology. 3. Analyse know rights to health and application of Biotechnology in Medicine and also about Intellectual Property Rights. 4. Assess the use of natural resource Environmental Biotechnology and Use Technologies
20.	HR 303 A	Human Rights and Duties – Advocacy and Extension work and Viva-Voce	2021	<ol style="list-style-type: none"> 1. To understand the students that the issues for peoples movements and public advocacy on human rights and duties 2. To understand the students on extension work with respect to human rights. 3. To understand the students about the uses of NGOs fact finding and uses of information media.
21.	HR 303 B	Socially/Economically Disadvantaged people and Human Rights and Duties	2021	<ol style="list-style-type: none"> 1. To expose the students about the concept of the Constitutional Safeguards and Special Protection Laws and Policies. 2. To understand the students about the concept of the disadvantaged people in the Indian Society.

				3. To understand the students about the Institutional Mechanisms for protecting the human rights of the disadvantaged groups.
22.	HR 303 C	Human Duties and Responsibilities	2021	<ol style="list-style-type: none"> 1. To understand the student about the concept of human duties and responsibilities. 2. To expose the student about human values and values of humanism. 3. To apprise the students about evaluation of human duties.
23.	HR 303 D	Children and Human Rights and Duties	2021	<ol style="list-style-type: none"> 1. To understand the student about the concepts of Child Labour and protecting norms at National and International level. 2. To apprise the student that the status of children in Indian society with respect to human rights. 3. To understand the students about the National and International mechanisms for protecting the child rights.
24.	HR 304	Soft Skills	2021	<ol style="list-style-type: none"> 1. To understand the student that the concepts of soft skills with respect to human rights. 2. To understand the student in employability skills in human rights aspects. 3. To expose the students that the professional skills for team building and problem solving.
25.	HR 305 A	Historical and Philosophical Perspectives of Human Rights	2021	<ol style="list-style-type: none"> 1. To expose the student that the a basic understanding to the concepts of human rights, human values, dignity, justice and equality.

				<ol style="list-style-type: none"> 2. To understand the students that the theories of human rights in various inter disciplinary dimensions. 3. To apprise the student that the concept of Magna Carta-Bill of Right-French and American-Declaration and Uncharted on human rights.
26.	HR 305 B	Human Rights and Duties in India	2021	<ol style="list-style-type: none"> 1. To understand the students about the concepts of Constitutional Human Rights and Responsibilities. 2. To apprise the students that Extra-ordinary situations and human rights in India. 3. To understand the violations of rights in present Civil Society in India.
27.	HR 401	Human Rights in Andhra Pradesh	2021	<ol style="list-style-type: none"> 1. To expose the students about various Human Rights Movements at National and State Andhra Pradesh) Level. 2. To understand the concept of social stratification and problems of Caste and Un-touchability. 3. To expose the students that the gender inequality and various gender violation in Andhra Pradesh.
28.	HR 402	Development, Trade and Human Rights	2021	<ol style="list-style-type: none"> 1. To understand the student about the concept of human rights of various vulnerable groups ath National and International level. 2. To apprise the student about the Trade related human rights violations and Trade development. 3. To understand the student about the role of human rights in development.
29.	HR 403 A	International, Humanitarian and Refugee Laws	2021	<ol style="list-style-type: none"> 1. To expose the students about the concepts of International Humanitarian Law and Implementation enforcements of IHL. 2. To apprise the student about the concept of International Refugee Law and protection under International Law. 3. To understand the students about solution to Refugee Problem.

30.	HR 403 B	Environment and Human Rights and Duties	2021	<ol style="list-style-type: none"> 1. To expose the student about the concept of Environment and rights to clean environment. 2. To apprise the students about the International regimes for protection. 3. To understand the students about the role of various agencies for protecting environment with respect to human rights.
31.	HR 403 C	Human Rights and Criminal Justice System	2021	<ol style="list-style-type: none"> 1. To expose the student about the concept of the International Human Rights systems. 2. To understand the student about the International Organisations for protecting the Human Rights. 3. To understand the students about the UN Organs and Human Rights.
32.	HR 403 D	Minorities and Human Rights and Duties	2021	<ol style="list-style-type: none"> 1. To student understand that the concept of evolutionary perspectives and Institutional mechanisms for protection of Minorities. 2. To expose the student that rights and duties of Minorities under in the Indian System. 3. To apprise the student that the Minorities and human rights challenges.
33.	HR 405 A	Development, Globalization and Human Rights	2021	<ol style="list-style-type: none"> 1. Understand to role of Human Rights in Development and various theories of development. 2. Analyses the new international

				<p>Economic Order (NIEO), WTO GATT and International Trade and Human Rights Perspective in India.</p> <p>3. Evaluate the Globalisation and its impact on agriculture, environment, labour, women, culture and health.</p> <p>4. Know about the Transnational Corporations (TNCs) and Human Rights violations and Impact of GATT-WTO on sovereignty.</p>
34.	HR 405 B	Women and Human Rights and Duties	2021	<p>1. To expose the students about the concept or the status of women in various sectors with respective human rights.</p> <p>2. To expose students about the National and International norms for protection at International and National level.</p> <p>3. To apprise the students about the Institutional mechanisms for Protection of rights of women.</p>

Human Rights and Duties

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes

1	HR – 101	Human Rights: Concepts and Theoretical Perspectives	2021	<ol style="list-style-type: none"> 1. To Expose the students about nature and concept of Human Rights. 2. To apprise the students about the Liberal. Marxian prerspectives. 3. To expose the students that alternative, third world and Indian Perspectives of Human Rights,
	HR -102	Human rights in India:The Constitutional & Legal Frame Work	2021	<ol style="list-style-type: none"> 1. Students to know the Indian Constitution and Human Rights. 2. To understand the Judiciary and Human Rights. 3. To understand about Criminal Justice system in India.
3	HR – 103	Human Rights & Duties Education	2021	<ol style="list-style-type: none"> 1. To expose students about the importance of Human Rights and Duties education. 2. To apprise the students about the target groups for Human Rights 3. To expose the students about the content of Human Rights Education.
4	HR – 104	Rights & Implementation Machinery	The 2021	<ol style="list-style-type: none"> 1. To expose the students about the implementation machineries at National Level and International Level. 2. The students understand about how the problems in Accessing Judice through Courts and Tribunals. 3. To expose the students that statutory bodies of Human Rights.

5	HR – 105(A)	Working Class And Human Rights And Duties	2021	<ol style="list-style-type: none"> 1. To understand the students about the status of working class, concept and issues. 2. To expose the student about the basic rights and duties of various sections. 3. To understand the Indian Constitutional Frame work.
5	HR – 105(B)	Human Rights Education, Teaching and Training	2021	<ol style="list-style-type: none"> 1. To expose the student about the origin, UNO and Human Rights education policies. 2. To apprise the students about the principles and practice in teaching of Human Rights Education.
6	HR – 106(A)	Human Rights Activism and Role of NGO's	2021	<ol style="list-style-type: none"> 1. To expose the students about the different types of Human Rights Activisms. 2. To identify the student that the different Types of NGO's and their role for promoting the Human Rights.
7	HR – 106(B)	Social Movements and Human Rights in India	2021	<ol style="list-style-type: none"> 1. To expose the students about the role of NGOs for protecting human rights. 2. To Understand the student about the Political Movements, Ecological and Environmental Movements of Human Rights. 3. To apprise the student about the various types of Social and Political Reforms of Human Rights.
8	HR – 107	Human Values and Professional Ethics – I	2021	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values. 2. To understand the student about nature of Values, Ahimsa and various religion theories. 3. To assess the student about various Crime and Theories of punishments.

9	HR – 201	Human Rights & Indian Polity	2021	<ol style="list-style-type: none"> 1. To expose the students about the concept of basic structure of Indian Polity, administrative structure in India. 2. To apprise the student about the role of People’s Agencies for protecting and promotion of human rights in India. 3. To understand the students about the Legislative Procedure and implementation process in India.
10	HR – 202	Emerging Dimensions of Human Rights	2021	<ol style="list-style-type: none"> 1. To expose the students about the Human Rights and Duties of Non-State Armed Groups and Commercial Corporations. 2. To understand the students about the rights of future generation. 3. To apprise the students about the Human Rights and Changing Dimension of State Sovereignty and Humanitarian’ Intervention.
11	HR – 203	Human Rights: The International Context	2021	<ol style="list-style-type: none"> 1. To understand the students about the evolution of human rights and UN charter of human rights. 2. To expose the students about regional dimensions of human rights and special conventions on human rights. 3. To understand the students about International conventions on human rights and duties.
12	HR – 204	Research Methodology, Statistics and Computer Applications	2021	<ol style="list-style-type: none"> 1) Student to Know Scope of Social Research. 2) To Understand Data Analysis. 3) Understand About Types of Data Collections

13	HR – 205(A)	Human Rights: The Socio Economic Context	2021	<ol style="list-style-type: none"> 1. To expose the students about the socio, economic background of human rights. 2. To apprise the students about human rights of vulnerable groups. 3. To understand the students about the basic human need for development with respect to human rights.
14	HR – 205(B)	Societal Issues of Human Rights in India	2021	<ol style="list-style-type: none"> 1. To understand the student about the societal problems of human rights. 2. To understand the students about the social problems of minorities, scheduled caste and scheduled tribes. 3. To expose the students about Regionalism, terrorism.
15	HR – 206(A)	Human Rights And Criminal Justice System	2021	<ol style="list-style-type: none"> 1. To expose the students about Rights of Inmates of Prisons and Custodial Homes. 2. To understand the students about the Right to Legal Aid, Access to Justice and Speedy Justice. 3. To expose the students that the problems of human rights.
16	HR – 207	Human Values and Professional Ethics – II	2021	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values. 2. To understand the student about nature of Values, Ahimsa and various religion theories. 3. To assess the student about various Crime and Theories of punishments.
17	HR – 301	Social Movements and Human Rights and Duties	2021	<ol style="list-style-type: none"> 1. To expose the student about conceptual perspectives of social movements and human rights. 2. To apprise the students about the social, political and religious reforms movements and human rights. 3. To expose the students that the role of International and National Institutions in promoting Human Rights.

18	HR – 302	Science,Technology,Hu man Rights and Duties	2021	<ol style="list-style-type: none"> 1. Understand the basic concept in science and technology and also about Indian perspective on science and technology. 2. Ability to know about the Right to Adequate Food, Agricultural, Biotechnology Impact of on Agriculture, Food Biotechnology and Revolution in Information Technology. 3. Analyse know rights to health and application of Biotechnology in Medicine and also about Intellectual Property Rights. 4. Assess the use of natural resource Environmental Biotechnology and Use Technologies
19	HR – 303(A)	Human Rights and Duties Advocacy and Extension Work	2021	<ol style="list-style-type: none"> 1. To understand the students that the issues for peoples movements and public advocacy on human rights and duties 2. To understand the students on extension work with respect to human rights. 3. To understand the students about the uses of NGOs fact finding and uses of information media.
20	HR – 303 (B)	Socially / Economically disadvantaged People and human rights and duties	2021	<ol style="list-style-type: none"> 1. To expose the students about the concept of the Constitutional Safeguards and Special Protection Laws and Policies. 2. To understand the students about the concept of the disadvantaged people in the Indian Society. 3. To understand the students about the Institutional Mechanisms for protecting the human rights of the disadvantaged groups.

21	HR – 303 (C)	Human duties and responsibilities	2021	<ol style="list-style-type: none"> 1. To understand the student about the concept of human duties and responsibilities. 2. To expose the student about human values and values of humanism. 3. To apprise the students about evaluation of human duties.
22	HR – 303 (D)	Children and human rights and duties	2021	<ol style="list-style-type: none"> 1. To understand the student about the concepts of Child Labour and protecting norms at National and International level. 2. To apprise the student that the status of children in Indian society with respect to human rights. 3. To understand the students about the National and International mechanisms for protecting the child rights.
23	HR – 304	Soft and employability skills	2021	<ol style="list-style-type: none"> 1. To understand the student that the concepts of soft skills with respect to human rights. 2. To understand the student in employability skills in human rights aspects. 3. To expose the students that the professional skills for team building and problem solving.

24	HR – 305 (A)	Historical and Philosophical Perspectives of Human Rights	2021	<ol style="list-style-type: none"> 1. To expose the student that the a basic understanding to the concepts of human rights, human values, dignity, justice and equality. 2. To understand the students that the theories of human rights in various inter disciplinary dimensions. 3. To apprise the student that the concept of Magna Carta-Billof Right-French and American- Declarationand Uncharted on human rights.
25	HR – 305 (B)	Human Rights and Duties in India	2021	<ol style="list-style-type: none"> 1. To understand the students about the concepts of Constitutional Human Rights and Responsibilities. 2. To apprise the students that Extra-ordinary situations and human rights in India. 3. To understand the violations of rights in present Civil Society in India.
26	HR – 401	Human rights in andhra pradesh	2021	<ol style="list-style-type: none"> 1. To expose the students about various Human Rights Movements at National and State Andhra Pradesh) Level. 2. To understand the concept of social stratification and problems of Caste and Un-touchability. 3. To expose the students that the gender inequality and various gender violation in Andhra Pradesh.

27	HR – 402	Development, trade and human rights	2021	<ol style="list-style-type: none"> 1. To understand the student about the concept of human rights of various vulnerable groups at National and International level. 2. To apprise the student about the Trade related human rights violations and Trade development. 3. To understand the student about the role of human rights in development.
28	HR – 403(A)	International humanitarian and refugee Laws	2021	<ol style="list-style-type: none"> 1. To expose the students about the concepts of International Humanitarian Law and Implementation enforcements of IHL. 2. To apprise the student about the concept of International Refugee Law and protection under International Law. 3. To understand the students about solution to Refugee Problem.
29	HR – 403(B)	Environment and human rights and duties	2021	<ol style="list-style-type: none"> 1. To expose the student about the concept of Environment and rights to clean environment. 2. To apprise the students about the International regimes for protection. 3. To understand the students about the role of various agencies for protecting environment with respect to human rights.

30	HR – 403(C)	International human rights system	2021	<ol style="list-style-type: none"> 1. To expose the student about the concept of the International Human Rights systems. 2. To understand the student about the International Organisations for protecting the Human Rights. 3. To understand the students about the UN Organs and Human Rights.
31	HR – 403(D)	Minorities and human rights and duties	2021	<ol style="list-style-type: none"> 1. To student understand that the concept of evolutionary perspectives and Institutional mechanisms for protection of Minorities. 2. To expose the student that rights and duties of Minorities under in the Indian System. 3. To apprise the student that the Minorities and human rights challenges.
32	HR – 405(A)	Development, Globalization and Human Rights	2021	<ol style="list-style-type: none"> 1. Understand to role of Human Rights in Development and various theories of development. 2. Analyses the new international Economic Order (NIEO),WTO GATT and International Trade and Human Rights Perspective in India. 3. Evaluvate the Globalisation and its impact on agriculture, environment, labour, women, culture and health. 4. Know about the Transnational Corporations (TNCs) and Human Rights violations

33	HR – 405(B)	Women and human rights and duties	2021	<ol style="list-style-type: none"> 1. To expose the students about the concept or the status of women in various sectors with respective human rights. 2. To expose students about the National and International norms for protection at International and National level. 3. To apprise the students about the Institutional mechanisms for Protection of rights of women.
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15. Law

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CO -101	Mass Media Law	2021	<ol style="list-style-type: none"> a. Have a detailed and sophisticated understanding of the general principles governing freedom of speech, the public interest and the media; b. Have a detailed, technical and specialised understanding of the constraints imposed on the media in the reporting of court proceedings; c. Have developed the ability to independently understand, research and critically analyse legal and scholarly developments that contribute to professional practice in the area of media law; and d. Have a detailed, technical and specialised understanding of defamation law in India and comparatively; e. Have developed expert knowledge of the practical operation of defamation law in India and comparatively;

2	CO-102	Public Utilities Law	2021	<ul style="list-style-type: none"> a. government policy in regard to such utilities in general and to each utility in particular, b. The growth and evolution of the public utilities; c. patters of the laws of incorporation and d. powers, functions and liabilities of the public utilities vis-a-vis their employees, consumers and others.
3	CO- 103	Law and Social Transformation in India	2021	<ul style="list-style-type: none"> a. Critically analyse the Law as an instrument of social change and product of tradition and culture b. Explore the nature and function of Law as an institution and process interlinked with the social and economical philosophy of education. c. Examine development of law from historical processes and how for the a touch of modernization and value can be added to legal system d. To analyse the different approaches of Law and Justice
4	CO - 104	Indian Constitutional Law: The New Challenges	2021	<ul style="list-style-type: none"> a. Understand and interpret Constitution to address the emerging complex issues; b. Explore the various functional theories, doctrine and Constitutional principles working in the backdrop and its interplay with the emerging issues; and c. Examine the boundaries, limitations, of Constitution from different perspectives and explore the possible approaches of interpretation and understanding from the perspective of Law and Justice.
5	CO - 201	Union – State Finance Relations	2021	<ul style="list-style-type: none"> a. To understand India as development of complex federal structure (Quasi) federal and its strength and weaknesses; b. Explore the various functional theories, doctrine and Constitutional principles of federalism and its interplay under Indian Constitution; and c. To examine the area of conflicting interest between Union and State and primacy of Union over the State.
6	CO - 202	Constitutionalism, Pluralism and Federalism	2021	<ul style="list-style-type: none"> a. To explore the basic principles of Constitutionalism, different model of federalism and its interplay in the Indian legal system; b. To examine the adoption of, utility and justification of Constitutional model in India; and c. To analyse India as pluralist society and suitability of

				various model, approaches in India in functional aspects of comparison with other legal system.
7	CO – 203	Judicial Process	2021	<ul style="list-style-type: none"> a. Intended to highlight the role of court as policy maker, participant in the power process and as an instrument of social change. b. expose the intricacies of judicial creativity and the judicial tools and techniques employed in the process. c. Since the ultimate aim of any legal process or system is pursuit of justice, a systematic study of the concept of justice and its various theoretical foundations is required. d. Intends to familiarise the students with various theories, different aspects and alternative ways, of attaining justice.
8	CO – 204	Legal Education and Research Methodology	2021	<ul style="list-style-type: none"> a. Critically analyse the various research skill, especially in the field of law; b. To develop the skill of application of teaching methods in legal education c. To understand and analyse the various strength and weakness of teaching learning and research process for the field of law; and d. To develop the skill of utilising computer technology for Legal education and Legal research.
9	CO – 301	Human Rights	2021	<ul style="list-style-type: none"> a. Acknowledge the social and economic rights of workers, forced labour, child labour, bonded labour, slavery, trade union, social security, right to health, standard of living, protection of families etc. b. To gain and acquire the knowledge about cultural rights of indigenous population. c. Understand the third-generation solidarity right of various populations. d. Acknowledge the ideas and knowledge about Human right Protection system of United Nations in the light of Covenant of Civil and Political rights.

10	CO – 302	National Security, Public Order and Rule of Law	2021	<ul style="list-style-type: none"> a. Understand and interpret various provision and safeguards to protection national security; b. To explore the various approach of public order, importance of rule of law and different legislations; c. Balancing the civil liberties and power of state; and d. Explore the various functional institution like election commission, parliament and check and balance on the national importance.
11	CO- 303	Practical Training	2021	<ul style="list-style-type: none"> a. Critically apply the understanding and application of legal research principles to legal research writing; b. To explore the various stages and its application for the practical record work; c. To have the development of idea, and its application; d. To have the ability to provide the original and non-plagiarised work to the existing field of knowledge e. Legal aid Camps and Legal Literacy Programmes, Court Observation work. f. On the completion of the course students will develop an inclination towards research and academics.
12	CO- 304a	Environment Protection and The Law	2021	<ul style="list-style-type: none"> a. Study the relationship between environment and climate change as well as the role of law, judiciary, resolution mechanisms but the alternate energy solutions and how people are dealing with climate changes, environmental laws and implementation of available solutions.
13	CO- 304b	Intellectual Property Rights Law	2021	<ul style="list-style-type: none"> a. To give philosophical underpinnings of traditional notion of property and IP • b. To examine the link between Industrial development & IP protection • To examine the conceptual development of IP concepts through judicial approach • c. To examine the impact of IP on economy, health and daily activities • d. To understand the basic principles enunciated in international agreements relating to IP
14	CO- 401	Dissertation and Viva-Voce	2021	<ul style="list-style-type: none"> a. Identify key research questions within the field of Demography on which you will carry out independent

				<p>research.</p> <p>b. Manage your time effectively whilst working on your independent research.</p> <p>c. Demonstrate appropriate referencing and develop skills in other aspects of academic writing.</p> <p>d. Demonstrate knowledge and understanding of report writing.</p> <p>e. Apply the demographic/statistical research training acquired in the taught element of the programme by designing an appropriate research strategy and research methodology to carry out your research</p>
15	CO – 402a	Law of Consumer Protection	2021	<p>a. Define provision under the Consumer Protection and Right to Information Act and apply them to situations accordingly</p> <p>b. Draft a consumer complaint with ease</p> <p>c. Confidently approach a Consumer Forum and get aware of the redressal mechanism</p> <p>d. To expose the students about Consumer Protection Laws;</p> <p>e. To develop the conceptual understanding of Consumer Protection regime.</p>
16	CO- 404 b	International Human Rights (MOOC / ONLINE COURSE)	2021	<p>a. Analyze and comment on key controversies surrounding the development of international human rights law</p> <p>b. Use conceptual tools to follow the developments of human rights law</p> <p>c. Be most effective in contributing to the enforcement of international human rights law</p>

16. Library and Information Science

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	LIS-101	Foundation of Library and Information Science	2021	1.Know the various types of libraries and their role in the society

				<p>2. Learn the Professional ethics and library Legislation in India</p> <p>3. Understand LIS education in India and various library associations in India</p>
2	LIS102	Knowledge Organization:Classification Theory	2021	<p>1.. Understand the definition, need and purpose of classification</p> <p>2. Learn the Fundamental Categories, Facet Analysis, types of Isolates in all schemes of classification</p> <p>3. Understand the Notation, trends and developments in Classification</p>
3	LIS-103P	Knowledge Organization:Classification Practice	2021	<p>1.Learn the Dewey Decimal Classification Scheme</p> <p>2. Get the skill regarding assigning the class numbers</p> <p>3.Have knowledge on Tables and Schedules of DDC</p>
4	LIS-104	Knowledge Management	2021	<p>1.Get an idea on the concepts of knowledge management, types of knowledge</p> <p>2.Understand the knowledge creation models, knowledge transfer in E-World</p> <p>3.know the tools for knowledge management and neural network and datamining</p>
5	LIS-105 (A)	Introduction to Information Technology	2021	<p>1.Gain knowledge on the concepts of computer basics and Network technologies</p> <p>2.Understand the concepts of Operating Systems, Programming Languages and types of softwares</p> <p>3.Learn the Database Management systems, steps</p>

				in development of databases and get an idea on different library software packages
6.	LIS 106(A)	Information and Communication	2021	<p>1. Get an idea on the concept of data, Information, Knowledge and wisdom.</p> <p>2. Understand the types of communication and channels of communication</p> <p>3. Understand the difference between the information society and knowledge society.</p>
7	LIS-107	Human Values and Professional Ethics-I	2021	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
8.	LIS-201	Information Sources and Services	2021	<p>1. Learn documentary and non-documentary sources and different types of information sources</p> <p>2. Know about the Indian and British National Bibliographies, and Electronic Books</p> <p>3. Understand the virtual reference service and translation Services</p>
9.	LIS-202	Knowledge Organization: cataloguing Theory	2021	<p>1. Understand the basic ideas on catalogue, forms of the catalogue, Main Entry and added entries</p> <p>2. Know the Canons, Principles and Laws of Cataloguing</p>

				3.Gain the knowledge on different types of subject headings, Cooperative and Centralized cataloguing
10.	LIS-203P	Knowledge Organization: cataloguing Practice	2021	<p>1.Gain knowledge on Anglo American Cataloguing Rules</p> <p>2.Learn the preparation of Main entry and added entries for monographs and serial publications</p> <p>3. Gain the skills on preparation of entries on cartographic materials, manuscripts and sound recordings</p>
11	LIS-204P	Meta data Standards- Practice	2021	<p>1.Know the Metadata and its types, standards</p> <p>2. Learn the skills on KOHA Software</p> <p>3.Learn the skills on MARC 21 and Dublincore</p>
12	LIS-205(A)	Library Management	2021	<p>1.Gain knowledge on meaning and purposeofmanagement, Organizational Structures</p> <p>2.Able to identify the factors behind selection, procurement and accessioning of documents</p> <p>3.Gain knowledge on a circulation system suitable for a library, different budgetary methods and its standards, norms and principles</p>
13	LIS 206(A)	Scholarly Communication	2021	<p>1.Gain knowledge on components and channels of scholarly communication.</p> <p>2. Understand the basic concept of copyright Act.</p> <p>3.Learn skills on Electronic Journals' and Databases</p>
14	LIS-207	Human Values and Professional Ethics-II	2021	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today</p>

				<p>life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
15	LIS-301	Information Processing and Retrieval Theory	2021	<p>1.Understand the basic concepts on Information procession and Retrieval and various schemes on classification</p> <p>2.Learn the Indexing Systems and Techniques and their Evaluation Criteria and Studies</p> <p>3.Gain knowledge on Web based Information Retrieval Systems</p>
16	LIS-302	Library Automation and Digital Library	2021	<p>1.Learn the basics of Library Automation, various modules of library automation software packages and their features</p> <p>2.Gain knowledge on basic concepts and characteristics of digital libraries</p> <p>3.Know about network and communication devices, digitization and metadata</p>
17	LIS-303 (A)	Internship	2021	<p>1.Attain skills on all types of sections and its maintenance in libraries in which they underwent training</p> <p>2.Get skills on maintenance of Digital Library</p> <p>3.Learn the skills on preservation and conservation of manuscripts and digitization</p>
18	LIS-303(B)	Academic Library System	2021	<p>1.Know the basic objectives, growth and development of Academic Libraries in India, UK and USA</p> <p>2.Learn about an overview of higher education in India, UGC, its powers and functions and its role in the development of academic libraries</p> <p>3.Understand the total design of the building, techniques of financial management, and know the organization of library and information services needed by distance learners and special users</p>
19	LIS-304	Communication, Soft skills and Etiquette	2021	<p>1.Understand the different types of softskills</p>

				<p>2.Learn the presentation skills like:Role Plays, Public Speaking skills etc.</p> <p>3.Gain knowledge on written communication skills, essay writing, report writing etc.</p>
20	LIS-305B	Information Literacy (OE)	2021	<p>1.Learn the concepts of Information Literacy and sources of Print and Electronic Information</p> <p>2.Get the skills on information access through INFLIBNET Network</p> <p>3.Able to understand the Internet and its search techniques and Intellectual Property Right</p>
21	LIS-401	Research Methodology	2021	<p>1.Understand the definition, need and purpose of various research methods</p> <p>2.Get the knowledge on Research design, techniques and tools</p> <p>3.Gain the skills on Data analysis and Interpretation of Data in SPSS.</p>
22	LIS-402P	Software for Libraries-Practice	2021	<p>1.Attain knowledge on D Space, GreenstoneDigital Library Softwares</p> <p>2.Learn about Koha : Library Management Software, E-Resources, Directory of Open Access Journals,</p> <p>3.Get an idea on designing of Web Page and Data Mining</p>
23	LIS-403(A)	Information Processing and Retrieval: UDC and Indexing Practice	2021	<p>1. 1.Gain knowledge on Universal Decimal Classification</p> <p>2.Learn different Indexing systems</p> <p>3.Understand the design and development of thesaurus</p>
24	LIS-40(B)	Management of Information System	2021	<p>1.Know the basic concepts in Management, and various methods of decision-making and its application to Library and Information Centers</p> <p>2.Understand the budgeting techniques and methods and policies and procedures</p> <p>3.Gain knowledge on system analysis, PERT/CPM</p>

25	LIS -404C	Dissertation/Project Work	2021	<p>1.Gain Knowledge on how to select the theme for their work</p> <p>2.Learn the writing styles, preparation of questionnaire, data analysis and interpretation and Citation styles</p> <p>3.Get the skills on findings and conclusion in dissertation</p>
26	LIS-405-(A)	Technical Writing	2021	<p>1.Know the definition and types of technical writing</p> <p>2.Attain the idea on technical writing process and styles</p> <p>3.Get the skills on technical writing techniques, use of MS-Office for preparation and presentation of technical writing</p>

18.Performing Arts(Music)

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	162	MA Performing Arts(Music)	2021	<p>PAM-105-A (P) Abhyasa Gana -1</p> <p>Clear cut training of foundation in Carnatic Music</p>

2	162	MA Performing Arts(Music)	2021	PAM-105 -B (P) Abhyasa Gana-2 Clear cut training of foundation in Carnatic Music which helps to understand the effective aspects of the program
3	162	MA Performing Arts(Music)	2021	PAM-105-C (P) Abhyasa Gana-3 Basic level voice culture training of foundation in Carnatic Music which helps the student to adopt any voice change for rendering light music , classical and semi classical
4	162	MA Performing Arts(Music)	2021	PA-M 204 Compositions in Rare ragas widening knowledge of the student to perform rare ragas which is challenging in nature
5	162	MA Performing Arts(Music)	2021	PA-M 205 (a) Abhyasa Gana -4 Clear advance level training of foundation in Carnatic Music
6	162	MA Performing Arts(Music)	2021	PA-M 205 (b) Abhyasa Gana -5 Clear cut advance level training of foundation in Carnatic Music
7	162	MA Performing Arts(Music)	2021	PA-M 205 (C) C Abhyasa Gana -6 Clear cut advance level training of foundation in Carnatic Music
8	162	MA Performing Arts(Music)	2021	PA-M 206 (a) Compositions from Geya Natakas Compositions from other genre of music will give wide oppurtunity for employment
9	162	MA Performing Arts(Music)	2021	PA-M 302 Group kritis widening knowledge to perform group kritis
10	162	MA Performing Arts(Music)	2021	PA-M 303 A Vakra Ragas Ability to plan and execute a successful Carnatic concert Ability to create new variety in Concerts
11	162	MA Performing Arts(Music)	2021	PA-M 303 B Manodharma Sangita To enrich the knowledge of innovative music in students
12	162	MA Performing Arts(Music)	2021	PA-M 303 D Post trinity compositions To educate the student about the recent past composition of Carnatic music
13	162	MA Performing Arts(Music)	2021	PA-M 304 Communication & Soft Skills (T) To promote soft skills among the students so as to develop attributes that could enhance interactions, earning power and job performance.
14	162	MA Performing Arts(Music)	2021	PA-M 305 - A – Patriotic /Folk Songs To inculcate students about patriotism and to educate about the music of the Land.
15	162	MA Performing Arts(Music)	2021	PA-M 402 Concert Ability to plan and execute a successful Carnatic concert Ability to create self employment opportunity

16	162	MA Performing Arts(Music)	2021	PA-M 403 A Ragam Tanam Pallavi Learn and inculcate the most creative part of Carnatic Music To help student to shape out the creative rendering style of the student
17	162	MA Performing Arts(Music)	2021	PA-M 403-B Compositions of Dance Repertoire Knowledge in application of music in other art fields like theatre, opera etc Knowledge to select and utilize ragas according to the theme and text.
18	162	MA Performing Arts(Music)	2021	PA – M 403 - C Post trinity composers- 20th century and beyond To make the student aware about the musical forms of recent personalities of Carnatic music
19	162	MA Performing Arts(Music)	2021	PA-M 404 Project work Introduce to the methodology of doing research in music and introducing to data collection, analysis etc and train up him to look into the facts based on evidences
20	162	MA Performing Arts(Music)	2021	PA – M 405 - A - Compositions of Annamacharya To educate students about devotional music of Tirupati deity and the composer. Music of this land

16.philosophy				
S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Classical Indian Philosophy	2021	.1The Student has applied the knowledge of classical Indian Philosophy. 2.The Student has analyzed the principles of classical Indian Philosophy
2	102	Epistemology Indian	2021	1. The Student has known the Indian Epistemology 2. The Student has understood the Pramanas in Indian Philosophy
3	103	Logic Indian and Western	2021	1. The Student has known the Indian

				Epistemology 2. The Student has understood the Pramanas in Indian Philosophy
4	104	Western Philosophy- Greek and Medieval	2021	1.The Student has known the important issues of Western Philosophy 2. The Student has understood the Principles of greek and medieval Philosophy
5	105-A	Problems in Metaphysics	2021	1. The Student has known the Problems of Metaphysics 2. The Student has understood the Principles of Metaphysics
6	202	Ethics- Indian	2021	1. The Student has known the Ethics in Indian Philosophy 2. The Student has understood the various Ethical Principles in Indian Ethics.
7	203	Ethics –Western	2021	1. The Student has known the Ethics in Western Philosophy 2. The Student has understood the Ethical theories of Western Philosophy
8	204	Modern Western Philosophy	2021	1. The Student has known the Problems of Modern Western Philosophy 2. The Student has understood the thoughts of Modern Western Philosophers.
9	205-A	Philosophy of Education	2021	1. The Student has known the Contents of

				Philosophy of Education. 2. The Student has understood the Educational aspects of Philosophy of Education
10	207	Audit course (HVPE)	2021	1. The Student has known the essence contents of human values. 2. The Student has understood the Professional Ethics..
11	301	Social and Political Philosophy	2021	1. The Student has known the contents of social Philosophy. 2. The Student has understood the Principles of Political Philosophy.
12	302	Philosophy of Vedanta	2021	1 . The Student has known the Philosophy of Vedanta. 2. The Student has understood the Philosophical Doctrines of Vedantas
13	303-A	Philosophical Approach to Gandhi	2021	1. The Student has known the metaphysical issues of Gandhi. 2. The Student has understood the Gandhian Philosophy
14	303-B	Philosophy of B.R.Ambedkar	2021	1. The Student has analyzed the Philosophy of Ambedkar.. 2. The Student has applied the Philosophical aspects of Ambedkar.
15	305-A	Philosophy of Value Education	2021	1.The Student has known the importance of Education... 2. The Student has understood the Philosophical values for life.
16	305-B	Sri Venkateswara Studies	2021	
17	401	Phenomenology and Existentialism	2021	1. The Student has analyzed the contents of

				Phenomenology.. 2. The Student has applied the Philosophical Principles of Existentialism
18	402	Comparative Religion	2021	a.The Student has analyzed the aspects of Comparative Religion.. b. The Student has applied the Philosophical Principles of different Religions
19	403-A	Philosophy of Jiddu Krishnamurti	2021	1.The Student has known the Philosophy of Jiddu Krishnamurti... 2. The Student has understood the Philosophical insights and of jiddu Krishnamurti
20	403-B	Analytical Philosophy	2021	1. The Student has known the contents of Analytical Philosophy. 2. The Student has understood thePhilosophy of Philosophers of Analytical Philosophy..
21	403-C	Sri Vaishnavism	2021	1.The Student has analyzed the aspects of SriVaishnavism.. 2. The Student has applied the Philosophical Principles of .SriVaishvaism
22	403-D	Research Methodology and Computer Applications	2021	1.The Student has analyzed the principles of Research Methodology.. 2. The Student has applied the computer operating and applying principles
23	404	Philosophy of Peace	2021	
24	405-A	Philosophy of Yoga	2021	1.The Student has analyzed the principles of Research Methodology.. 2. The Student has applied the computer operating and applying principles

20. Physical Education

S.No	Name of the Course	Course Code	Year of introduction	Course Outcomes
1	B.P.Ed	Bachelor of Physical Education	2014-15	100%
2	Ph.D	Ph.D	2008	100%

21. Political Science & Public Administration

S.No	Name of the Course	Course Code	Year of introduction	Course Outcomes
1	PSC - 101	Population characteristics and theories	2021	<ol style="list-style-type: none">1. Identify basic demographic concepts and definitions in Population studies2. Impart knowledge on Population trends in size and growth of population at regional, national and global level.3. Discover the implications of different theories on past and present population components with special reference to Malthusian theory
2	PSC - 102	Fertility	2021	<ol style="list-style-type: none">1. Examine the basic concepts and measurements of fertility2. Assess, compare and contrast trends in fertility and its determinants3. Familiarize the concepts of nuptiality and factors affecting nuptiality4. Examine theories related to fertility and its applications in different situations
3	PSC - 103	Mortality	2021	<ol style="list-style-type: none">1. Identify the various concepts and measures of mortality2. Examine the global levels and trends in mortality and its determinants3. Acquire knowledge on techniques of life tables, constructions of multiple-decrement life table and computational aspects for demographical

				analysis
4	PSC - 104	Sources, evaluation and adjustment of data	2021	<ol style="list-style-type: none"> 1. Examine and compare merits and demerits of various sources of population data 2. Understand the evaluation of data, factors affecting completeness of data 3. Reproduce knowledge on population projections, calculations and applications
5	PSC – 105 (A)	Population education and extension	2021	<ol style="list-style-type: none"> 1. Examine the components of population education and create awareness on population education among the students and youth 2. Acquire skills to organize Extension Programmes in population education at school, college and Non formal educational levels 3. demonstrate training on population education methods and techniques in order to create awareness on population education
6	PSC – 105 (B)	Public health, nutrition and health education	2021	<ol style="list-style-type: none"> 1. Import knowledge on the importance of public health various health aspects, like curative, preventive and preventive aspects of public health. 2. Discover the indicators of health, food and its classification, Nutrition and balanced diet. 3. Imports knowledge n Nutritional policies and programmes, health education programmes and agencies involved in the health education.
7	PSC – 105 (C)	Health planning and policy	2021	<ol style="list-style-type: none"> 1. Understanding the Health services, indicators of health morbidity and mortality, structure and organization of health in India 2. Acquired knowledge on national and international agencies, NGO's involved in health programmes 3. Experiment skills in health planning process, decision making, budgeting and target setting in health programmes
8	PSC – 106 (A)	Population and development	2021	<ol style="list-style-type: none"> 1. Import knowledge on indicators of economic development, quality of life, human

		planning		<p>development index and modernization.</p> <p>2. Discover the consequences population growths on economic development with special reference to demographic behavior, behaviour in the context of socio economic changes.</p> <p>3. Identify food requirements and production, food security in relation to population growth</p>
9	PSC – 106 (B)	Population and environment	2021	<p>1. Examine the human geography and its relevant to population studies with reference to ecology and eco-system.</p> <p>2. Identify Environmental issue population global warming green house effect, ELNINO effect etc.,</p> <p>3. Examine the changing patterns conservations and management of land and policies, programme better management.</p>
10	AUDIT COURSE: PSC	Human values and professional ethics – I	2021	<p>1. Acquire and gain knowledge on different concepts of human values and behavioural changes.</p> <p>2. Recognizing the medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics of medical and health care professionals.</p> <p>3. Acquire skills on environmental ethics and its relation to Health</p> <p>4. Discover the Social ethics, human trafficking, human rights, and media ethics</p>
11	PSC - 201	Migration and multi-regional demography	2021	<p>1. Explore the different types and trends in migration</p> <p>2. Apply skills in measurement, causes and consequences of different migrations in different regions</p> <p>3. Explore the theories and recommend suitable policies of migration</p>
12	PSC - 202	N.G.O MANAGEMENT	2021	<p>1. Understand the role, importance and establishing of NGO's</p> <p>2. Explore the sources of funding of NGO's at national and international level</p>

				3. Explore demographic data by working with individuals, groups and communities
13	PSC - 203	STATISTICAL METHODS	2021	<ol style="list-style-type: none"> 1. Familiarize the basic statistical methods and its applications to demographic data 2. Demonstrate knowledge on methods and techniques of sampling 3. Acquire skills in processing of data with computer 4. Demonstrate the testing of hypotheses, t-tests, Chi-square tests, correlation and regression
14	PSC - 204	POPULATION SOCIOLOGY	2021	<ol style="list-style-type: none"> 1. Examine the basic sociological concepts, and evaluate the relationship of sociology to other social sciences 2. Identify the social institutions, social change and socialization and explore the sociological theories of fertility and its application in contemporary society 3. Explore the present society and its relationship to individual
15	PSC - 205 (A)	Population and Sustainable Development	2021	<ol style="list-style-type: none"> 1. Examine the concepts and theoretical issues relating to sustainable development and sustainable goals 2. Assess and measure the quality of life, resource creation, and management and distribution 3. Critically think of the relationship between population, environment, poverty and population sustainable growth
16	PSC - 205 (B)	Population economics	2021	<ol style="list-style-type: none"> 1. Gained knowledge on concepts of basic concepts of economics and its relation to population change 2. Acquired knowledge on measurements of national income, income distribution causes and consequences of inequalities in income. 3. Relate the population growth in relation to levels and trends, causes and policies of employment.
17	PSC - 205	Cf: disaster	2021	1. Summarize and understand the disasters and

	(C)	management		<p>Disaster Management</p> <p>2. Acquire a critical perspective of the policy framework, Institutional Structures and programmes for Disaster Management in India</p> <p>3. Explore Mental health consequences and able to provide Psychosocial care in Disaster Management</p>
18	PSC – 206 (A)	Community health	2021	<p>1. Discover comprehensive knowledge on concepts of community health, illness, disease prevention</p> <p>2. Critical thinking on epidemiology, communicable diseases and its prevention</p> <p>3. Understand and appreciate the concepts of health, nutrition, balance diet, nutrition deficiency diseases and National Health Programmes</p>
19	PSC – 206 (B)	Demographic data management	2021	<p>1. Import knowledge on census evaluation of Indian census and census organizations.</p> <p>2. Identity the SRS system in India, Model registration scheme, population registers.</p> <p>3. Discover the evaluation of census data, management techniques and errors in census, coverage and content errors.</p>
20	AUDIT COURSE: PSC	Human values and professional ethics – ii	2021	<p>1. Acquire and gain knowledge on different concepts of human values and behavioural changes.</p> <p>2. Recognizing the medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics of medical and health care professionals.</p> <p>3. Acquire skills on environmental ethics and its relation to Health</p> <p>4. Discover the Social ethics, human trafficking, human rights, and media ethics</p>
21	PSC - 301	Population geography	2021	<p>1. Enumerate the geographical factors affecting the distribution of population</p> <p>2. Awareness and understanding of trends in urbanization and its impact on ecological imbalance, global warming, greenhouse effects.</p> <p>3. Able to assess changing pattern of land use,</p>

				conservation of resources and critical thinking of policies, programmes for better management of environment
22	PSC – 302	Research methodology	2021	<ol style="list-style-type: none"> 1. Demonstrate in conducting population research and surveys 2. Prepare research design and apply sampling techniques 3. Discover skills in methods and tools of data collection, data analysis, interpretation, and report writing
23	PSC (A) -303	Population psychology	2021	<ol style="list-style-type: none"> 1. Appreciate the scope of psychology and the relationship between value of children and fertility 2. Familiarize and comprehend the significant psychological theories relevant to fertility and contraceptive behavior 3. Demonstrate leadership and effective communication skills in promoting health and family planning
24	PSC – 303 (B)	Population policy and programmes	2021	<ol style="list-style-type: none"> 1. Explore population policies related to fertility, mortality and migration 2. Acquire the knowledge on methods of family planning and acts relating to medical termination of pregnancy, age at marriage and also registration of vital events 3. Apply best practices and strategies for promoting family welfare programme.
25	PSC - 303 (C)	Gerontology	2021	<ol style="list-style-type: none"> 1. Understand the scope of gerontology and demographic dimensions of the elderly 2. Critically explore and analyze changes in status of elderly health, problems and needs of elderly 3. Acquire skills in dealing elderly issues like neglect, abuse, violence and abandonment caregivers stress and elderly neglect
26	PSC – 303 (D)	Population ecology, urbanization and Migration	2021	<ol style="list-style-type: none"> 1. Import knowledge on population policies influencing fertility, mortality and migration.

				<p>2. Discover the world population conferences and India conference on population policies programmes</p> <p>3. Examine the Administrative setups of family welfare programmes at the National, state, district and PHCs levels</p>
27	PSC -304 (A)	Soft and employability skills	2021	<p>1. Expose to soft skills and listening and its employability, types of listening, effective listening and barriers to listening.</p> <p>2. Import knowledge on communication skill and inter personal skills, types and stages.</p> <p>3. Expose to employability skill and its stages, professional skill, decision making skills and stress management.</p>
28	PSC – 305 (A):	Principles of population studies	2021	<p>1. Explore the components of population change, trends in size and growth of population</p> <p>2. Discover the concepts of fertility, mortality and migration</p> <p>3. Acquire skills in exploring the sources and quality of data on fertility, mortality and migration</p>
29	PSC – 305 (B)	Population, society and environment	2021	<p>1. Import knowledge on components of population changes and its social changes.</p> <p>2. Discover the population and socio-economic changes and its consequences of demography and social problems.</p> <p>3. Expose to ecology and Environment sustainable development in relation to population growth.</p>
30	PSC - 401	Communication for family welfare programmes	2021	<p>1. Examine the elements in communication process</p> <p>2. Understand and apply different approaches to communication</p> <p>3. Critically analyse and apply factors influencing a various communication methods to promote family planning</p>
31	PSC - 402	Reproductive health and adolescent issues	2021	<p>1. Examine the anatomy and physiology of human reproduction, conception and pregnancy</p>

				<ol style="list-style-type: none"> 2. Describe the male and female reproductive health problems 3. Assess and examine various adolescent issues
32	PSC – 403 (A)	Population growth and development	2021	<ol style="list-style-type: none"> 1. Understand the indicators of development with special reference to population growth and development. 2. Discover the concepts of economic inequality and its causes 3. Examine the status of women and development and demographic consequence of women empowerment
33	PSC – 403 (B)	Health economics	2021	<ol style="list-style-type: none"> 1. Explore the concepts in economics in relation to health and population dynamics 2. Acquire skills in assessing costing and health economics 3. Critically analyze and evaluate general health status and quality of life and also measurement of health outcomes
34	PSC – 403 (C):	Demography of andhra pradesh	2021	<ol style="list-style-type: none"> 1. Acquire knowledge on basic trends and changes in population growth in Andhra Pradesh 2. Examine the migration and urbanization, problems of slums and related policies with special reference to Andhra Pradesh 3. Explore the population policies and programmes in Andhra Pradesh
35	PSC – 403 (D)	Demographic techniques	2021	<ol style="list-style-type: none"> 1. Import knowledge on demographic techniques - life table, UN model life table, coale and demeny regional model life table. 2. Discover the stable population theory and its concept, measurement of migration and vital statistic methods. 3. Identity the interpolation smoothing of Age data and graduation techniques, projection of fertility, mortality and migration, Evaluation of projection.
36	PSC – 404	Disertation / project work	2021	<ol style="list-style-type: none"> 1. Develop in-depth knowledge of field work and community surveys

				<ul style="list-style-type: none"> 2. Acquire the skills to present and discuss the findings through seminars 3. Explore the skills in preparation and presentation of research findings
37	PSC (A) -405	Rural, urban and tribal community development	2021	<ul style="list-style-type: none"> 1. Explore the characteristics of rural, urban and tribal community 2. Discover community development and experiment projects in rural, urban and tribal areas 3. Critically examine and understand the issues related to rural, urban and tribal areas and approaches to community development
38	PSC (B) -405	Social policy and planning	2021	<ul style="list-style-type: none"> 1. Discover social policies in relation to Indian constitution. 2. Examine the approaches to social policy 3. Demonstrate and analyze various social policies and their implementation

22. Population Studies

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	PS 101	Population Characteristics and Theories	2021	<ul style="list-style-type: none"> 1. Identify basic demographic concepts and definitions in Population studies 2. Impart knowledge on Population trends in size and growth of population at regional, national and global level. 3. Discover the implications of different theories on past and present population components with special reference to Malthusian theory
2	PS 102	Fertility	2021	<ul style="list-style-type: none"> 1. Examine the basic concepts and measurements of fertility 2. Assess, compare and contrast trends in fertility and its determinants 3. Familiarize the concepts of Nuptiality and factors affecting Nuptiality 4. Examine theories related to fertility and its applications in different situations
3	PS 103	Mortality	2021	<ul style="list-style-type: none"> 1. Identify the various concepts and measures of mortality 2. Examine the global levels and trends in mortality and its determinants 3. Acquire knowledge on techniques of life tables, constructions of multiple-decrement life table and computational aspects for demographical analysis

4	PS 104	Sources, Evaluation and Adjustment of Data	2021	<ol style="list-style-type: none"> 1. Examine and compare merits and demerits of various sources of population data 2. Understand the evaluation of data, factors affecting completeness of data 3. Reproduce knowledge on population projections, calculations and applications 	
5	PS 105	A	Population Education and Extension	2021	<ol style="list-style-type: none"> 1. Examine the components of population education and create awareness on population education among the students and youth 2. Acquire skills to organize Extension Programmes in population education at school, college and Non formal educational levels 3. demonstrate training on population education methods and techniques in order to create awareness on population education
		B	Public Health, Nutrition and Health Education	2021	<ol style="list-style-type: none"> 1. Import knowledge on the importance of public health various health aspects, like curative, preventive and preventive aspects of public health. 2. Discover the indicators of health, food and its classification, Nutrition and balanced diet. 3. Imports knowledge n Nutritional policies and programmes, health education programmes and agencies involved in the health education.
		C	Health Planning and Policy	2021	<ol style="list-style-type: none"> 1. Understanding the Health services, indicators of health morbidity and mortality, structure and organization of health in India 2. Acquired knowledge on national and international agencies, NGO's involved in health programmes 3. Experiment skills in health planning process, decision making, budgeting and target setting in health programmes
6	PS 106	A	Population and Development Planning	2021	<ol style="list-style-type: none"> 1. Import knowledge on indicators of economic development, quality of life, human development index and modernization. 2. Discover the consequences population growths on economic development with special reference to demographic behavior, behaviour in the context of socio economic changes. 3. Identify food requirements and production, food security in relation to population growth
		B	Population and Environment	2021	<ol style="list-style-type: none"> 1. Examine the human geography and its relevant to population studies with reference to ecology and eco-system. 2. Identify Environmental issue population global warming green house effect, EL-NINO effect etc., 3. Examine the changing patterns conservations and management of land and policies, programme better management.
7	PS 107	Human Values and Professional Ethics - 1	2021	<ol style="list-style-type: none"> 1. Identify the concepts of ethics and its relation to religion, politics and environment 	

				<ol style="list-style-type: none"> 2. Memorize the different aspect of values and interpret the best skills in understanding the merits of value related aspects 3. Demonstrate to interpret crime and theories of punishment with special reference to acquire knowledge on Manu and Yajnavalkya 	
8	PS 201	Migration and Multi Regional Demography	2021	<ol style="list-style-type: none"> 1. Explore the different types and trends in migration 2. Apply skills in measurement, causes and consequences of different migrations in different regions 3. Explore the theories and recommend suitable policies of migration 	
9	PS 202	N.G.O Management	2021	<ol style="list-style-type: none"> 1. Understand the role, importance and establishing of NGO's 2. Explore the sources of funding of NGO's at national and international level 3. Explore demographic data by working with individuals, groups and communities 	
10	PS 203	Statistical Methods	2021	<ol style="list-style-type: none"> 1. Familiarize the basic statistical methods and its applications to demographic data 2. Demonstrate knowledge on methods and techniques of sampling 3. Acquire skills in processing of data with computer 4. Demonstrate the testing of hypotheses, t-tests, Chi-square tests, correlation and regression 	
11	PS 204	Population Sociology	2021	<ol style="list-style-type: none"> 1. Examine the basic sociological concepts, and evaluate the relationship of sociology to other social sciences 2. Identify the social institutions, social change and socialization 3. Explore the sociological theories of fertility and its application in contemporary society 4. Explore the present society and its relationship to individual 	
12	PS 205	A	Population Sustainable Development and	2021	<ol style="list-style-type: none"> 1. Examine the concepts and theoretical issues relating to sustainable development and sustainable goals 2. Assess and measure the quality of life, resource creation, and management and distribution 3. Critically think of the relationship between population, environment, poverty and population sustainable growth
		B	Population Economics	2021	<ol style="list-style-type: none"> 1. Gained knowledge on concepts of basic concepts of economics and its relation to population change 2. Acquired knowledge on measurements of national income, income distribution causes and consequences of inequalities in income. 3. Relate the population growth in relation to levels and trends, causes and policies of employment.

		C	Disaster Management	2021	<ol style="list-style-type: none"> 1. Summarize and understand the disasters and Disaster Management 2. Acquire a critical perspective of the policy framework, Institutional Structures and programmes for Disaster Management in India 3. Explore Mental health consequences and able to provide Psychosocial care in Disaster Management
13	PS 206	A	Community Health	2021	<ol style="list-style-type: none"> 1. Discover comprehensive knowledge on concepts of community health, illness, disease prevention 2. Critical thinking on epidemiology, communicable diseases and its prevention 3. Understand and appreciate the concepts of health, nutrition, balance diet, nutrition deficiency diseases and National Health Programmes
		B	Demographic Management Data	2021	<ol style="list-style-type: none"> 1. Import knowledge on census evaluation of Indian census and census organizations. 2. Identify the SRS system in India, Model registration scheme, population registers. 3. Discover the evaluation of census data, management techniques and errors in census, coverage and content errors.
14	PS 207		Human Values and Professional Ethics – II	2021	<ol style="list-style-type: none"> 1. Acquire and gain knowledge on different concepts of human values and behavioural changes. 2. Recognizing the medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics of medical and health care professionals. 3. Acquire skills on environmental ethics and its relation to Health 4. Discover the Social ethics, human trafficking, human rights, and media ethics
15	PS 301		Population Geography	2021	<ol style="list-style-type: none"> 1. Enumerate the geographical factors affecting the distribution of population 2. Awareness and understanding of trends in urbanization and its impact on ecological imbalance, global warming, greenhouse effects. 3. Able to assess changing pattern of land use, conservation of resources and critical thinking of policies, programmes for better management of environment
16	PS 302		Research Methodology	2021	<ol style="list-style-type: none"> 1. Demonstrate in conducting population research and surveys 2. Prepare research design and apply sampling techniques 3. Discover skills in methods and tools of data collection, data analysis, interpretation, and report writing.
17	PS 303	A	Population Psychology	2021	<ol style="list-style-type: none"> 1. Appreciate the scope of psychology and the relationship between value of children and fertility 2. Familiarize and comprehend the significant psychological theories

					<p>relevant to fertility and contraceptive behavior</p> <ol style="list-style-type: none"> 3. Demonstrate leadership and effective communication skills in promoting health and family planning
		B	Population Policy and Programmes	2021	<ol style="list-style-type: none"> 1. Explore population policies related to fertility, mortality and migration 2. Acquire the knowledge on methods of family planning and acts relating to medical termination of pregnancy, age at marriage and also registration of vital events 3. Apply best practices and strategies for promoting family welfare programme.
		C	Gerontology	2021	<ol style="list-style-type: none"> 1. Understand the scope of gerontology and demographic dimensions of the elderly 2. Critically explore and analyze changes in status of elderly health, problems and needs of elderly 3. Acquire skills in dealing elderly issues like neglect, abuse, violence and abandonment caregivers stress and elderly neglect
		D	Population Ecology, Urbanization and Migration	2021	<ol style="list-style-type: none"> 1. Import knowledge on population policies influencing fertility, mortality and migration. 2. Discover the world population conferences and India conference on population policies programmes 3. Examine the Administrative setups of family welfare programmes at the National, state, district and PHCs levels.
18	PS 304		Soft and Employability Skills	2021	<ol style="list-style-type: none"> 1. Expose to soft skills and listening and its employability, types of listening, effective listening and barriers to listening. 2. Import knowledge on communication skill and inter personal skills, types and stages. 3. Expose to employability skill and its stages, professional skill, decision making skills and stress management.
19	PS 305	A	Principles of Population Studies	2021	<ol style="list-style-type: none"> 1. Explore the components of population change, trends in size and growth of population 2. Discover the concepts of fertility, mortality and migration 3. Acquire skills in exploring the sources and quality of data on fertility, mortality and migration
		B	Population, Society and Environment	2021	<ol style="list-style-type: none"> 1. Import knowledge on components of population changes and its social changes. 2. Discover the population and socio-economic changes and its consequences of demography and social problems. 3. Expose to ecology and Environment sustainable development in relation to population growth.

20	PS 401		Communication for Family Welfare Programmes	2021	<ol style="list-style-type: none"> 1. Examine the elements in communication process 2. Understand and apply different approaches to communication 3. Critically analyse and apply factors influencing a various communication methods to promote family planning
21	PS 402		Reproductive Health and Adolescent Issues	2021	<ol style="list-style-type: none"> 1. Examine the anatomy and physiology of human reproduction, conception and pregnancy 2. Describe the male and female reproductive health problems 3. Assess and examine various adolescent issues
22	PS 403	A	Population Growth and Development	2021	<ol style="list-style-type: none"> 1. Understand the indicators of development with special reference to population growth and development. 2. Discover the concepts of economic inequality and its causes 3. Examine the status of women and development and demographic consequence of women empowerment
		B	Health Economics	2021	<ol style="list-style-type: none"> 1. Explore the concepts in economics in relation to health and population dynamics 2. Acquire skills in assessing costing and health economics 3. Critically analyze and evaluate general health status and quality of life and also measurement of health outcomes
		C	Demography of Andhra Pradesh	2021	<ol style="list-style-type: none"> 1. Acquire knowledge on basic trends and changes in population growth in Andhra Pradesh 2. Examine the migration and urbanization, problems of slums and related policies with special reference to Andhra Pradesh 3. Explore the population policies and programmes in Andhra Pradesh
		D	Demographic Techniques	2021	<ol style="list-style-type: none"> 1. Import knowledge on demographic techniques - life table, UN model life table, Coale and Demeny regional model life table. 2. Discover the stable population theory and its concept, measurement of migration and vital statistic methods. 3. Identity the interpolation smoothing of Age data and graduation techniques, projection of fertility, mortality and migration, Evaluation of projection
23	PS 404		Dissertation/ Project Work	2021	<ol style="list-style-type: none"> 1. Develop in-depth knowledge of field work and community surveys 2. Acquire the skills to present and discuss the findings through seminars 3. Explore the skills in preparation and presentation of research findings
24	PS 405	A	Rural, Urban, Tribal Development	2021	<ol style="list-style-type: none"> 1. Explore the characteristics of rural, urban and tribal community 2. Discover community development and experiment projects in rural, urban and tribal areas 3. Critically examine and understand the issues related to rural, urban and tribal areas and approaches to community development

		B	Social policy and planning	2021	<ol style="list-style-type: none"> 1. Discover social policies in relation to Indian constitution. 2. Examine the approaches to social policy 3. Demonstrate and analyze various social policies and their implementation
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Masters in Social Work

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MSW 101	Sociology for Social Work	2021	<ol style="list-style-type: none"> 1. Discover basic concepts in Sociology and examine the relation between individual and society. 2. Distinguish between Socialization, Social institutions and Social groups 3. Critically demonstrate , Social Stratification, Social Deviance, Social Change and Social Problems
2	MSW 102	Human growth and Personality Development	2021	<ol style="list-style-type: none"> 1. Memorize various stages of Human Growth and Development 2. Identify different concepts of Human Behavior like Motivation, Perception, Learning and Attitudes 3. Discover experience in assisting the person in Solving their Psycho social problems through personality development and adjustment
3	MSW 103	Social Work Profession and Field Work Orientation-1	2021	<ol style="list-style-type: none"> 1. Recall various concepts like Social Service, Social Welfare, Social Development and Social Work 2. Experiment on Ethical Values of Professional Social Work and analyze current trends in Social Work 3. Design field work in Social Work and acquire skills to involve the client in problem solving process

4	MSW 104	Social Work practice with Individuals and Groups	2021	<ol style="list-style-type: none"> 1. Recognize the basics Concepts , Techniques and Skills of case work 2. Apply different approaches of Case Work, Group Work 3. Evaluate the application of Social Case Work and Group Work at various settings like Schools, Hospitals, and Correctional Settings and in Communities. 	
5	MSW 105	A	Social Work Practicum-I	2021	<ol style="list-style-type: none"> 1. Recognize the significance of Social Work in various settings 2. Illustrate the application of Social Work Methods in the agencies during their field practicum 3. Examine the applications of Social Work Principles and Skills in the functions of different organizational systems
		B	Issues and Concerns in Occupational Social Work	2021	<ol style="list-style-type: none"> 1. Identify needs issues and problems effecting work life and organization life of Indian occupational workers. 2. Discover the issues and challenges of factory workers and industrial relations. 3. Identify working conditions and conditions of work in the workers in organized and unorganized sectors.
		C	Social Work Practice and Information Communication and Technology	2021	<ol style="list-style-type: none"> 1. Examine ICT application functions and Significance in the present context of social change 2. Able to analyze different technological devises and apps social networking sites. 3. Acquire skills in conducting and practicing ICT and Social work practices 4. Demonstrating professionalism in designing community map, community radio and developing documentaries and evidence building ICT use in social work practices

6		A	Social Work in Industry and Human Resource Management	2021	<ol style="list-style-type: none"> 1. Enrich knowledge on HRM, Personnel management, HR planning and management systems 2. Appraise organizational behavior, conflict Resolution Strategies and Legislation related to industrial relations 3. Develop skills in Industrial Social Work Practice and the role and significance of Corporate Social Responsibility
	MSW 106	B	Corporate Social Responsibility and Social Entrepreneurship and Social Work	2021	<ol style="list-style-type: none"> 1. Understanding concept, context and evaluation, models and perspectives of CSR. 2. Impart knowledge on the concept and context of social entrepreneurship in relation to socio-economic development. 3. Acquiring the knowledge skill and competencies of a social e entrepreneurship, financial management and fund rising.
7	MSW 107		Human Values and Professional Ethics - I	2021	<ol style="list-style-type: none"> 1. Familiarize the concepts of ethics and its relation to Religion, Politics and Environment etc. 2. Able to gain knowledge on different aspect of Values and Interpret the best Skills in understanding the merits of value related aspects 3. Discover to interpret Crime and Theories of Punishment with special reference to Manu and Yajnavalkya
8	MSW 201		Social Work Profession and Field Work Orientation-II	2021	<ol style="list-style-type: none"> 1. Recognize the Scope, Importance and Significance of Social Work Practice in different fields 2. Acquire Knowledge and Skills Essentials for Working with Groups and Communities 3. Formulate Capacity Building by organizing training and

				awareness programmes in the Field Work Settings
9	MSW 202	Social Work Practice with Communities	2021	<ol style="list-style-type: none"> 1. Acquainted with advanced level of knowledge in Community organization and Social Work practice 2. Appraise various approaches in Community Organization and Current issues in Community Organisation 3. Organize community participation using PRA methods and techniques
10	MSW 203	Social Action and Social Legislation for Social Work Practice	2021	<ol style="list-style-type: none"> 1. Distinguish the elements of Social action, Models and Process of Social Action 2. Connect the Social Legislations with Social Work Practice 3. Appraise Laws pertaining to Women, children and Aged in Social work practice
11	MSW 204	Social work Research	2021	<ol style="list-style-type: none"> 1. Acquainted with advanced level of knowledge in Social Work Research process and Statistics 2. Illustrate single subject and evaluation Research Designs along with various Research designs 3. Facilitate methods of Sampling, Data Collection, Analysis, Statistical-Applications and Report Writing
12	MSW 205	A Social Work Practicum-II	2021	<ol style="list-style-type: none"> 1. Examine the Nature, Scope and Functions of the different Government and non-profit organizations agency at ground level 2. Trained to assist their supervisor with in the limitations of the agency 3. Equipped with Professional Skills and Techniques through practical exposure

		B	Social Work Practice with Differently Abled	2021	<ol style="list-style-type: none"> 1. Import knowledge on concept, Nature and models of disability and understanding trends and current situation of disability. 2. Import knowledge on disability issues, problems and responses of disability. 3. Understanding policies, rehabilitation of persons with disability, services for the PWD.
		C	Social Work and Disaster Management	2021	<ol style="list-style-type: none"> 1. Summarize and understand the disasters and Disaster Management 2. Acquire a critical perspective of the policy framework, Institutional Structures and 3. programmes for Disaster Management in India 4. Explore Mental health consequences and able to provide Psychosocial care in Disaster Management
13	MSW 206	A	Counseling in Social Work Practice	2021	<ol style="list-style-type: none"> 1. Understanding the basics of Counseling and Approaches of Counseling 2. Develop ability to apply appropriate Counseling Techniques with Special Group 3. Demonstrate to apply Counselling Skills while working with clients in various settings like Health , Family and School Settings
		B	Social Welfare Project Formulation and Management	2021	<ol style="list-style-type: none"> 1. Understand the principles of social welfare admiration and process, aware of social welfare governmental agencies involved in social welfare. 2. Ability to start and run N.G.Os and carryout welfare activity independently. 3. Experiment skills in project formulation, programmer planning monitoring and evaluation.

14	MSW 207		Human Values and Professional Ethics - II	2021	<ol style="list-style-type: none"> 1. Summarize different concepts of Human Values and Behavioural changes required for adjustment in Family and Society 2. Demonstrates Medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics in Medical and Health care professionals. 3. Acquire Skills on Environmental ethics and the Environment and Health 4. Appraise Social Ethics, Human Trafficking, Human Rights, and Media Ethics
15	MSW 301		Social Intervention Work With Families	2021	<ol style="list-style-type: none"> 1. Discover the Family Centered Practice as a Model of Social Work practice and understand Family life management and Family Dynamics 2. Demonstrate Family Assessment and Application of Tools : Interviewing , Ecological assessment – Eco map , Generation assessment- Genogram, Triangle, Family Sculpture and Family Mapping 3. Integrate social work practice with Families and Social Work Therapeutic Interventions wherever appropriate
16	MSW 302		Social Work in the Field of Health	2021	<ol style="list-style-type: none"> 1. Examine the concept of Health, factors affecting health and Indicators of Health. 2. Evaluate Primary and Community healthcare services with special references to communicable and Non-communicable diseases 3. Assess the relevance, domains and nature of Social Work Intervention in different Health settings.
17	MSW 303	A	Criminal Justice and Social Work Practice	2021	<ol style="list-style-type: none"> 1. Acquiring knowledge on the concept, causation of crime, Theories of crime and punishment and its relations to social problems. 2. Understanding the concept of social difference and correctional services and also community based incentives with correction programmes. 3. Examine the juvenile Justice Act, Immoral Trafficking prevention Act, Narcotic drugs and Psychotropic substance Act etc.,

		B	Social Work Practicum-III	2021	<ol style="list-style-type: none"> 1. Analysis the role of Community and dramatize the Community Organisation in field work practice 2. Develop skills and expertise their Field Work exposure to organize community programmes 3. Examine the new Intervention programs in the area of their specialization to bring a solutions to the problems in different community
		C	Social Policy and Planning	2021	<ol style="list-style-type: none"> 1. Examine the nature and Approaches of Social Policy in the Socio-economic and political context 2. Assess the implementation of Social Welfare Policies in Education, Health, Women, Children and Environment 3. Examine the Role of Social Workers in Formulating , Planning and Implementation of Social Policies
		D	Gerontological Social Work	2021	<ol style="list-style-type: none"> 1. Identify the Scope of Social Work in the field of Gerontology. 2. Illustrate Changes in the status of Elderly, Health problems and needs of Elderly. 3. Experiment the social work interventional strategies to Elderly ,Care givers and Counseling
18	MSW 304		Soft and Employability Skills	2021	<ol style="list-style-type: none"> 1. Expose to soft skills and listening and its employability, types of listening, effective listening and barriers to listening. 2. Import knowledge on communication skill and inter personal skills, types and stages. 3. Expose to employability skill and its stages, professional skill, decision making skills and stress management
19	MSW 305	A	Fundamentals of Social Work	2021	<ol style="list-style-type: none"> 1. Examine basic concepts, Principles and Methods of Social Work 2. Defend values and Principles of Professional Social Work and Code of ethics for Social Workers 3. Evaluate Social Work Education in India, Professional Associations, Problems of Professionalization and Networks in Social Work
		B	Human Rights and Social Legislation	2021	<ol style="list-style-type: none"> 1. Acquainted with advanced level of knowledge in Human rights 2. Distinguish various Social Legislations and Legislations related to Women and Children 3. Nurture the Social Work Professionals by creating awareness on various current issues and related Legislations

20	MSW 401		Social Intervention Work With Children	2021	<ol style="list-style-type: none"> 1. Examine the Significance and Development of Child Welfare Services with special reference to Child Rights 2. Appraise various Institutional and Non-Institutional services for children in need 3. Create Professional Knowledge on Social Work Intervention with children in difficult situations
21	MSW 402		Rural, Urban, Tribal Development and Empowerment	2021	<ol style="list-style-type: none"> 1. Acquainted with advanced level of knowledge in rural Urban and Tribal community and Community Development Projects across the country 2. Trained to meet the challenges specifically related to Rural, Urban and Tribal communities 3. Will nurture the Social Work Professionals to become effective Social Worker and contribute to community by conducting awareness camps, strengthening Self-Help Groups and Facilitating Empowerment in the communities.
22	MSW 403	A	Social Work in the Field of Mental Health	2021	<ol style="list-style-type: none"> 1. Understand the concept and importance of Mental Health and Psychiatric Social Work 2. Distinguish Psychiatric disorders and application of Therapeutic Interventions in Psychiatric Illness 3. Plan to provide Psychiatric Rehabilitation to assist Mentally Ill patients
		B	Social Work Practicum-IV and Block Field work	2021	<ol style="list-style-type: none"> 1. Acquires training in the organization as social worker and develop sound knowledge on social work which will motivate them to start an NGO 2. Evaluate projects and organize programmes for fund raising 3. Hypothesize research in their area of specialization through which they can suggest recommendations to agencies for improving quality.
		C	Environment and Social Work	2021	<ol style="list-style-type: none"> 1. Import knowledge environment and social work leakages, Environmental Justice and climate and Justice with reference to social work. 2. Discover deferential impact of Environmental with reference to managerial groups of women, poor and indigenous populations. 1. Discover the measures for Environmental conservation and identify the approaches, movements and action for Environmental conservation.

		D	Diversity and Inclusiveness	2021	<ol style="list-style-type: none"> 1. Acquire knowledge on the concepts of diversity, inclusiveness and forms of social excuser 2. Ability to relate the politics of castes, status of dilits and constitutional safe guards in India. 3. Acquire knowledge on the concept of minority, types and composition of minorities and their poverty.
23	MSW 404		Social Work Project	2021	<ol style="list-style-type: none"> 1. Explore research studies at Micro levels and submit reports as Project Work 2. Apply Interview techniques and use data collection tools for research 3. Apply theoretical knowledge and frame policies for to solve the society problems
24	MSW 405	A	NGO Management	2021	<ol style="list-style-type: none"> 2. Distinguish the Concept, Structure, Registration and By laws of NGOs 3. Demonstrate Organisational Management and source of funding of NGOs 4. Familiarize to organize Human Resource Management in NGOs
		B	Health Education	2021	<ol style="list-style-type: none"> 1. Discover the Roles, Responsibilities, Approaches and ethics in Health Education 2. Describe the Behavioral, Environmental, and Genetic risk factors for Communicable and Non- communicable diseases. 3. Evaluate channels of Health education and organizational health set up at Central, State and District levels

23. Sanskrit

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SNSKT 101	Elements of Darsanas-I	2021	An understanding of the evolution of Darsanas I. To create an awareness of the Darsanas ii. Acquire Knowledge of the Baudda and Jaina Darsanas iii. To get the Knowledge of Meemamsa Sastra
2	SNSKT-102	Vedic Texts-I	2021	I. Students able to get the Vedic knowledge II. Students know the importance of Vedic gods

				III.Students are understanding the Vedic chandas IV.To make understanding the spiritual knowledge through Kathopanishat
3	SNSKT-103	PROSE AND POETRY-1	2021	I.An understanding of evolution of Sanskrit poetry across the ages until the modern age II.Get the knowledge of gadya kavya III.Understand the poetical skills IV.Understand the importance of kiratarjuneeya in Sanskrit literature
4	SNSKT-104	DRAMA, ALANKARA AND PROSODY -1	2021	Student will be able to get I.Understanding the features of Sanskrit drama II.Knowledge of organ and development of Sanskrit dramas III.Understanding the efficiency of kalida's poetic skill. IV.Get the knowledge of chandas V.Get the knowledge of different types of chandas
5	SANSKT105 (A)	HISTORY OF SANSKRIT LITERATURE – 1	2021	After completed of course the students are able to I.Know the origin and development of Sanskrit literature II.Know the importance of Vedas and its date. III.Know the meaning and contest of Brahmanas, Aranyakas and Upanishads IV.Know the social conditions as reflected in the Brahmanas V.Know the importance of Ramayana and its date
6.	SANSKT :105(B)	DRAMA AND POETRY -1	2021	I.Students will be able to gain understanding the features of Drama, Sentiment Moralities II.Through understanding the importance and place of Rasa in the Drama III.The knowledge about the skillfulness of Bhavabhutis Dramatergy IV.Recognize the transpiration of human experiences into dramatic experiences V.The knowledge about importance of Sandesa Kavyas in Sanskrit Literature
7.	SANKT :105(C)	ALANKARA AND PROSODY - 1	2021	I.Students will understand the different types of Alankara II.Know the importance of Alankara in the poetry III.Understand the development of on the basis of similar IV.Recognize the Guru and Laghu in prosody V.Know the importance of melody through prosody
8.	SANSKT:106(A)	COMPARATIVE PHILOLOGY AND	2021	After complication of the course students are able to- I.Find out the main causes of semantic change

		SIDDHANTA KOUMUDI- 1		II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing skills without grammatical mistakes..
9.	SANSKT:10 6 (B)	KAVYALANKARA SUTRA VRITTI -I	2021	I.Know the definition of poetry and prose II.Know the different types of Kavya III.Understand the different types of Riti IV.Understand the Pada and Padartha Doshas.
10.	SANSKT:10 7	HUMAN VALUES AND PROFESSIONAL ETHICS -I	2021	After completion of the course students are able to I.Understand Bhagavad Gita as a guide for modern life style II.Know the principles of Buddhism and Jainism III.Realize the necessary of practicing Human values and ethics in walks of life IV.Acquire the knowledge of Good and Bad V.Know the about crime and punishment according manu and Yajnavalkya
11	SANSKT – 201	ELEMENTS OF DARSANAS –II	2021	After completion of the course students are able to – I.Understand the knowledge of upamana and sabda pramanas II.Get the knowledge of Ayatharthanu Bhava III.Understand the Bahavana IV.Understand the Principals of Sankhya
12	SANSKT – 202	VEDIC TEXTS –II	2021	Students will know- I.The importance of Suktas II.The definition and purpose of Nirukta III.The meaning of Vedic words
13	SANSKT – 203	PROSE AND POETRY - II	2021	Students will able to get I.The beautification of prose literature. II.Enhancement of knowledge in appreciation of classical poetry III.Understanding about text that are selected. IV.Teaching skills in prose and poetry.
14	SANSKT – 204	DRAMA ALANKARA AND PROSODY – II	2021	Students will know I.The different characteristic features in Dramas II.The importance of nature and hermitages III.The features of Alankara and

				Classification of Alankaras IV.The knowledge of prosody
15	SANSKT 205 (A)	HISTORY SANSKRIT LITERATURE –II	2021	After the completion of the course students are able to I.Know the features of Mahakavyas II.Know the structure of Drama and social message III.Know the moral values through the tales IV.Get the glance of classical Sanskrit literature
16	SANSKT 205 (B)	DRAMA AND POETRY - II	2021	I.Get knowledge of good II.Know the character of Hero and Hero in etc., in the Drama III.Know the changes stories between original and creativeness IV.Know the importance skill fullness in poetry of Kalaidasa
17	SANSKT 205 (C)	ALANKARA AND PROSODY - II	2021	I.Know the features and Examples II.Understand the different types of Uktis in Alankaras III.Know the difference between stuti and Ninda Alankaras IV.Get knowledge of sikharini and Mandakranta vrittis V.Know the definition and importance of Gayatri Matras
18	SANSKT 206 (A)	COMPARATIVE PHILOLOGY AND SIDDHANTA KAUMUDI – II	2021	After complication of the course students are able to – I.Find out the main causes of semantic change II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing Skills without grammatical mistakes
19	5 (B)	KAVYALANKARA SUTRA VRITTI - II	2021	I.Know the difference between Guna and Alankara II.Ability to understand the theory of Riti III.To enable to understand the usage of Sabdalankaras IV.Know the contribution of Vamana to alankara sastra
20	SANSKT 207	HUMAN VALUES AND PROFESSIONAL ETHICS - II	2021	I.Understand the relevance of value based education in modern society II.Understand the old traditions of medical ethics III.Understand the solutions of illegal and unethical practice IV.Understand the man and nature, Natural calamities and get the solution regarding those situations.
21	SANSKT :301	(Sahitya) RASAGANGADHARA, (ANANA.I) – I (IE)	2021	After the completion of the course students are able to I. Understand the Rasaswarupa II.Understand the purpose of Kavya and different types of Kavya III.Know the interpretations of Rasa sutras and ten types of Gunas

				IV.Know the Abhasas
22	SANSKT :302	DHVANYALOKA - 1	2021	on completion of the course students are able to I.Understand the Dhvani swarupam II.Understand the opinion of Dhvanyabhavavadins III.Know the Dhavanikavya Lakshana IV.Know the Vyangya as Kavyatma V.Get the knowledge of splendid sastra Dhvanyaloka
23	SANSKT :303-A	KAVYAPRAKASA AND DASARUPAKA- 1(IE)	2021	Students will get - I.The knowledge of definition of kavya, types of kavyas II.The Knowledge about verities of vyangya III.The Knowledge of vyanjanaswarupa IV.An idea of ten types of Rupakas
24	SANSKT:30 3-B	HISTORY OF SANSKRIT POETICS AND SANSKRIT ESSAY-I	2021	On completion of the course students are able to I. Get the knowledge of sentence formation to write the essays on different issues II. Acquire the knowledge of Alankarikas III.Understand the different theories in Alankara sastra. IV.Understand the theory of Alankara and Rithi.
25	SANSKT:30 3-C	Natyasastram Chapter I & VI only	2021	
26	SANSKT:30 3-D	Bhojaraja's Champu Ramayana (Balakanda only)	2021	
27	SANSKT:30 4	Personality Development in Pancatantra (Mitrabheda and Mitrapraptikam only)	2021	.I.Know the losses arriving out of Non friend ship II.Know the world knowledge III.Achieving personality development through Panchatantra
28	SANSKT:30 5-A	Introduction of Sanskrit languag Infant Reader complete	2021	
29	SANSKT:30 5-B	Raghuvamsam (Ist canto only)	2021	on completion of the course students are able to I.Understand the greatness of Sanskrit Language II.Know the greatness of poetry III.Get knowledge on panchamahakavya's after the epic literature

				IV.Get the knowledge about the kalidasas Natural and beautiful creations V.Understand the uses of upamalankara by kalidasa
30	SANSKT:40 1	(SAHITYA) RASAGANGADHARA (ANANA-I)	2021	After completion of the course students are able to I.Know the number of Rasas in kavyas II.Know the uses of Rasa to elevate the situations in kavya III.Acquire the knowledge of Gunas and their role in Kavyas IV.Understand the differentiation of Bhava in Alankara sastra.
31	SANSKT :402	DHVANYALOKA –II	2021	Students will be able to get- I.The knowledge about different forms of schools II.Knowledge about the classification of Dhvani Siddhanta III.Knowledge regarding different alankara dhvanis IV.Know the difference between Rasadhvani and Rasavadalankara V.Know the main Rasa in Ramayana and Mahabharatha
32	SANSKT:40 3(A)	KAVYAPRAKASA AND DASARUPAKA– II	2021	After the completion of the course students are able to – I.Understand the structure of the Kavya II.Get the knowledge of Rasa and it's Bhedas III.Find out the classification of Dhvani IV.Understand the Lakshana of Nataka V.Get the knowledge about 10 types of Nataka Bhedas
33	SANSKT:40 3(B)	HISTORY OF SANSKRIT POETICS AND SANSKRIT ESSAY-II	2021	After the completion of the course students are able to – I.Get the knowledge of writing skills II.Acquire the knowledge of several Aesthetic poets like Mammata, Ruyyaka III.Understand the main theories on kavya of different poets IV.Get the knowledge of presentation skills on social related issues
34	SANSKT :403(C)	Kavyadarsa Chapter – I	2021	
35.	SANSKT :403(D)	KavyaMeemamsa first to Eight Adhyayas	2021	
36.	SANSKT :404	Introduction to Epigraphy and	2021	After the completion of the course students are able to I.Get the knowledge of inscriptions

		Manuscriptology		II.Acquire the knowledge of Brahmi and kharoshthi scripts III.Get the knowledge of writing materials in Ancient India IV.Get the knowledge of edition and critical edition of Manuscripts
37.	SANSKT :405 (A)	Hithopadesa of Narayanapandita and Mitralabha and Mitrabheda	2021	Students will be able to I.Get the moral values II.Understand the mentality of different kinds of people in the society III.Acquire the knowledge to behave a good citizen and a well human being IV.Understand the message through neetikavya
38.	SANSKT :405(B)	Kautilya'sArthasastra Chapter – I (Vinayadhikarikam)	2021	

24. Sociology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MASO-101	Classical Sociological Theories	2021	1. This paper seeks to expose the students to the classical thinkers and their contribution in building theoretical sociology. 2. To Compare and contrast the basic theoretical perspectives of sociology 3. To acquaint students with recent trends in Sociological thought.
2	MASO -102	Sociological Research Methods and Statistics	2021	1. This course aims to enable the students to understand the fundamental nature of the scientific approach towards social research and apply the skills in undertaking social research. 2. To equip the students with strategies of development for different segments of society.

				3. To provide ways and means of understanding and studying social reality
3	MASO -103	Indian Society and Inclusive Growth	2021	<ol style="list-style-type: none"> 1. This paper presents a comprehensive and integrated profile 2. To gain a better understanding of past and present structure and continuity of society 3. Identify and analyze the problems in Indian society and suggest solutions from sociological perspective
4	MASO -104	Participatory Research	2021	<ol style="list-style-type: none"> 1. This paper is to inspire students to undertake research in partnership with stakeholders 2. To explain the emancipatory and empowering, collaborative and reflective approaches 3. To discuss the relationship between PRA and scientific method to incorporate the results to change the practice and policy.
5	MASO -105	Principles of Sociology	2021	<ol style="list-style-type: none"> 1. This paper gives the students an understanding of the basic principles of Sociology as an academic discipline 2. To analyze the ways in which people interact and function in groups 3. It provides a basic knowledge on the fundamental aspects of the important social institutions
6.	MASO -106	Human values and Professional Ethics - 1	2021	<ol style="list-style-type: none"> 1. To help students distinguish between values, skills, and understand the need, basic guidelines, content and process of value education 2. To provide Human Values and Ethics relating to Religion, Business, Law, Media and Environment 3. To provide an in depth knowledge about the

				Moral and ethical values for interpretation in their day to day life
7.	MASO -201	Applied Sociology	2021	<ol style="list-style-type: none"> 1. To help students develop clear understanding of key concepts in classical and contemporary sociology and how these concepts relate to some of the perennial themes in the discipline 2. To develop an appreciation of the link between sociological theory and practice 3. To help students master the art of explaining abstract material in clear, precise ways that can be easily understood even by a lay man
8.	MASO -202	Social Demography	2021	<ol style="list-style-type: none"> 1. To introduce the significance of population and its relation to society 2. To provide a theoretical knowledge of the basic concepts of population and changes 3. To enable the students to realize impact of population , changing global scenario, awareness on population control devices and analyse prospects
9.	MASO -203	Rural Sociology and Development	2021	<ol style="list-style-type: none"> 1. This course is to help the students to understand the difference between urban and rural development 2. To analyse the dynamics of rural Indian society in the context of its socio, political and economic contradictions 3. To evaluate the problems related to development in relation to the needs and aspirations of the marginalized sections
10.	MASO -204	Extension Work	2021	<ol style="list-style-type: none"> 1. This paper expose the students to apply sociological theories and principles in field areas 2. To give direct experience of social institutions and social problems through field work 3. To train for creative and innovative experiences in social field using research

				techniques
11	MASO -205	Environmental Sociology	2021	<ol style="list-style-type: none"> 1. This paper aims to provide the students with a comprehensive conceptual, theoretical and empirical backgrounds of interaction between Social world and Nature 2. To explore the relationship between human society and the larger natural environment 3. To prepare the students for further research in broad areas of environment and natural resource governance from sociological perspective
12	MASO -206	Human Values and Professional Ethics-II	2021	<ol style="list-style-type: none"> 1. To provide knowledge about Value oriented education, Medical ethics, Family values , Ethics and Moral code 2. To provide the Business, Environmental and social ethics followed and practiced 3. To enhance values of self-esteem and self-respect among students
13	MASO -301	Medical Sociology	2021	<ol style="list-style-type: none"> 1. This course will help the students to understand the concepts of health and illness 2. To understand the social facts of health and the root causes of illness 3. To apply sociological theories, concepts, and research to experiences of health, illness, health education, public health and the intense public issues related to health
14	MASO -302	Urban Sociology and Development	2021	<ol style="list-style-type: none"> 1. This paper attempts to analyse the urban social world and its dynamics, various theoretical constructs concerning the patterning and growth of towns and cities 2. To understand the various theoretical approaches to urban development and apply them to different aspects of cities 3. To study historical, economic, and political trends that have affected the growth and development of cities

15	MASO -303	Field Work and Extension (Village placement)	2021	<ol style="list-style-type: none"> 1. This paper aims at direct exposure of students to the real world and problems confronting society 2. Students will carry out field work in village for 10 days for practical experience 3. To learn about sociological study techniques like Participatory Rural Appraisal, Sampling, Interview and Extension
16	MASO 304	Generic electives (a) Human Rights	2021	<ol style="list-style-type: none"> 1. To study Human rights and Constitutional framework 2. To recognize the role of human rights in development, theories of development, development and tradeoff on human rights 3. To Understand the social, political, cultural, and comparative construction of human rights history , institutions, discourses, and futures
		(b) Sociology of Gender	2021	<ol style="list-style-type: none"> 1. To examine how society influences understandings and perception of differences between masculinity (what society deems appropriate behaviour for a “man”) and femininity (what society deems appropriate behaviour for a “woman”). 2. To understand influences of gender on identity and social practices. 3. To pay special focus on the power relationships that follow from the established genderorder in a given society and changes over time.
		c) Gerontology	2021	<ol style="list-style-type: none"> 1. This paper aims at understanding physical, psychosocial, and cultural aspects of the aged 2. To understand aging transitions and intergenerational issues at various contexts and its nexus 3. To examine health and illness adjusting to loss and care of persons with chronic illnesses and rehabilitative needs
		(d) Sociology of Andhra Pradesh	2021	<ol style="list-style-type: none"> 1. This paper aims to study the historical outline

				<p>and emergence of Andhra society</p> <ol style="list-style-type: none"> 2. To understand the culture and various social movements in Andhra Pradesh 3. To analyze the welfare and developmental programmes of the rural and urban Andhra Pradesh
17	MASO -305	Open elective (a) Social Psychology and Personality Development	2021	<ol style="list-style-type: none"> 1. This paper aims at the understanding the relationship of cognition and attitudes of individual and society 2. To focus on psychological aspects of the individual in the context of social behaviour 3. To examine group dynamics such as group thinking and decision making, leadership, persuasion, conflict and cooperation)
		(b) Business And Society	2021	<ol style="list-style-type: none"> 1. This paper aims at understanding the concepts of Social economy and knowledge management 2. To examine the business community and social responsibility 3. To understand the inter-relation among business firms, organizations , public policy, business law and governance
23	MASO -401	Criminology	2021	<ol style="list-style-type: none"> 1. This paper seeks to describe the students about the different types of crime and scope of criminology 2. To illustrate the causes of crime and crime rates 3. To study the crime scientifically through data on crime, trends and various theoretical approaches
24	MASO-402	Industrial Dynamics	2021	<ol style="list-style-type: none"> 1. This paper aims to provide the students about the structure and process of industrial organizations from sociological perspective 2. To deal with the effects of industrialization on Indian social systems and institutions 3. To study the internal relations which are

				connected directly or indirectly with industry
25	MASO-403	Field Work	2021	<ol style="list-style-type: none"> 1. This paper aims at exposing students in analysing the data 2. To understand the different variations in viva-voce 3. To understand the recent patterns in Practice
26	MASO-404	Generic electives (a) Social Welfare and Welfare Administration	2021	<ol style="list-style-type: none"> 1. This paper aims at understanding the efficiency of resources and services to meet the needs of the individuals, families, groups and communities 2. To understand the problems of Schedule castes, Schedule tribes, Backward classes and Minorities 3. To facilitate social relationship and adjustments necessary for the disadvantaged sections, children, women, youth and elderly
		(b) Social Entrepreneurship Development	2021	<ol style="list-style-type: none"> 1. The aim of this paper is to understand the theoretical positions of the Social entrepreneurship development 2. To be aware of the contemporary approaches to social entrepreneurship 3. To have comprehensive understanding of the context, process and effects of entrepreneurial activities
		(c) Sociological Perspectives	2021	<ol style="list-style-type: none"> 1. This paper aims at the students to compare and contrast basic theoretical perspectives of sociology through rigorous scientific enterprise 2. To sensitize the need for empirically grounded theories 3. To acquaint students with the recent trends in Sociological thought
		(d) Globalization and society	2021	<ol style="list-style-type: none"> 1. This paper aims at the students to understand the nature and dynamics of globalization and social context though various agencies

				<ol style="list-style-type: none"> 2. To analyze the interconnected changes in the economic, cultural, social, and political spheres of society 3. To understand ever-increasing integration of nations, regions, communities
27	MASO-405	Open elective (a) Globalization and Educational Pursuits	2021	<ol style="list-style-type: none"> 1. This paper aims to understand multifaceted nature of globalization and internationalization in the context of higher education 2. To examine key concepts and theories of globalization, international and comparative education 3. To make the students understand the Global citizenship from professional and academic perspective
		(b) Visual Sociology	2021	<ol style="list-style-type: none"> 1. This paper aims at providing the students a new perspective in study of deliberate versus spontaneous behavior 2. To be aware of recording social signals, expressions as spontaneous as possible 3. To organize the recording of reactions and variations that occur as a response to the context

25. Tamil

26. Telugu Studies

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	TEL 101	Prescribed texts : classical poetry and drama	2021	<ol style="list-style-type: none"> 1. Understand the significance of Ancient Traditional and Classical Literature. 2. Understand the History and the Characteristics and the Practice of Epic Poetry. 3. Understand the Soci - Political, Cultural and Economic conditions of the ancient days.

				4. Acquire Language Knowledge indepth.
2	TEL 102	General linguistics	2021	<ol style="list-style-type: none"> 1. Understand the General Linguistics. 2. Acquaint the Various branches of Linguistics. 3. Understand the Phonology, Syntax and Phonetics. 4. Understand the Services of Indian and Westren Linguists.
3	TEL 103	History of telugu literature - i	2021	<ol style="list-style-type: none"> 1. Understand that how to study the methods of History of Literature. 2. Understand the different works of various Poets in Classical Literature, Part - I 3. Understand the Political, Religious and Cultural Life Styles analysed in classical Literature, Part - I 4. Understand the various Genres in Classical Literature, Part - I
4	TEL 104	Grammar and prosody	2021	<ol style="list-style-type: none"> 1. Interpret, analyze, evaluate and respond to the ideas about classical Telugu Grammer. 2. Understand the aims and Characteristics of Classical Poetry and Grammar terminology. 3. Understand the concepts of some Parichhedas in Balavyakaranam. 4. Understand the aims and Features of Prosody in Classical Poetry.
5	TEL 105 A	Folk lore	2021	<ol style="list-style-type: none"> 1. Understand the Folk Literature and Folk Arts from Native Languages. 2. Understand with the rich regacy of Literature in Folk Arts and Cultural Artifacts 3. Understand with traditional performing Art Forms from Native rural life.
6	TEL 105 B	Sataka sahyamu	2021	<ol style="list-style-type: none"> 1. Understand the importance of Special Genre 'Sathakam' and its divisions. 2. Understand the Special features of Sathakam and its Origin and Evolution. 3. Understand the Special Sathakas of Baddena, Marada Venkayya and Vemana.
7	TEL 105 C	Special study : potana	2021	<ol style="list-style-type: none"> 1. Understand the importance of potana and the devotion in Bhagavatham.

				<p>2. Understand the social Conditions during the time of Poet Pothana.</p> <p>3. Understand the ultimate goal of Life and the way of Life.</p>
8	TEL 106 A	Classical telugu literary genres	2021	<p>1. Understand to learn the relation between Literature and Genre.</p> <p>2. Understand the ancint genres and its Special features in Classical Telugu Literature</p> <p>3. Understand the different Genres and its Special features in Classical Telugu Literature</p>
9	TEL 106 B	Pada sahyam	2021	<p>1. Unverstand the Various Geners of Indigenous Literature.</p> <p>2. Understand the Desi Literature Preserved in the Form of Divers native cultures and races.</p> <p>3. Understand the musical compositions and writings of Annamayya, Saranagapani ect.</p>
10	TEL 107	Human values and professional ethics –i	2021	<p>1. Realize the necessity of practicing Human values and Ethics in all walks of life including the profession they opt for</p> <p>2. Understand Bhagavat Gita as a guide for modern lifestyle.</p> <p>3. Understand thought of Jainism and its necessity in contemporary living.</p> <p>4. Understand the principles of Buddhism for a better living.</p> <p>5. Understand the punishments given in Manu Smuriti for a comparsion with modern punish ments.</p>
11	TEL 201	Priscribed texts : modern peotry	2021	<p>1. Understand the significance of Modern Poetry.</p> <p>2. Understand the Socio - Political Cultural and Economic conditions of the Modern Days.</p> <p>3. Understand the Modern and Contermprary Trends in Telugu Poetry.</p> <p>4. To acqire the Knowledge of Present Social - Scenario in depth.</p>
12	TEL 202	Evolution of telugu language	2021	<p>1. Understand the origin of Various Telugu Dialectts.</p> <p>2. Understand the Practicality of the need of</p>

				Standard Language in Using Various fields. 3. Understand to undertake Research in the Various aspects of Telugu Dialects.
13	TEL 203	History of telugu literature - 2	2021	1. Understand the Political, Religious and Cultural life styles of various Ages in later part of Classical Literature. 2. Understand the reasons to establish the Modern Age in Telugu Literature. 3. Understand some of the modern trends in the History of Telugu Literature.
14	TEL 204	Grammar and poetics	2021	1. Understand the Knowledge of Classical Telugu Grammar. 2. Understand the Grammatical Terms particularly in Bala Vyakaranam. 3. Understand the Various Alankaras in Telugu Literature.
15	TEL 205 A	Rayalaseema sahityam	2021	1. Understand the Historical and Geographical back - ground of Rayalaseema. 2. Understand the Special Culture and Dialect of Rayalaseema. 3. Understand the ancient and modern Literature of Rayalaseema in Different Genres
16	TEL 205 B	Comparitive literature	2021	1. Understand the Origin and the development of Comparitive study 2. Understand the various aspects of Comparitive study in various genres like Poetry. Novel and Short Story 3. Understand the comparitive aspects of south Indian Languages
17	TEL 205 C	Special study : Potuluri veera brahmam	2021	1. Understand the importance of Pothuluri Veerabrahman and his thoughts from his Literature. 2. Understand the social Conditions during the period of Pothuluri Veerabrahmam. 3. Understand the ultimate goal of life and the way of philosophycal Life
18	TEL 206 A	Modern telugu literary genres	2021	1. Understand the modern Telugu poetry, Novel and Short Stories.

				<p>2. Understand the major Trends in Modern Telugu Literature.</p> <p>3. Understand the influence of westren Literature on Modern Telugu Literature</p>
19	TEL 206 B	Samsthana sahityam	2021	<p>1. Understand the Samstaanas and its histories in Telugu States.</p> <p>2. Understand the major poets and writers and their writings of various Samstaanaas.</p> <p>3. Understand the placement Telugu Literature.</p>
20	TEL 207	Human values, proessional ethics - ii	2021	<p>1. Understand the Human Values and relavence to present day.</p> <p>2. Understand the Medical ethics in all aspects.</p> <p>3. Understand the Business ethics to avoid immoral and illegal practices.</p> <p>4. Understand the Social ethics in all aspects.</p>
21	TEL 301	Classical literary criticism	2021	<p>1. Understand the Literary Criticism</p> <p>2. Understand the Origin and Development of various theories like Rasa, Dhvani ect. from Indian Alankara Sastras.</p> <p>3. Understand the earlier methods of Criticism in Telugu Literature.</p> <p>4. Understand the definitions and uses of Kavyas by Indian and Westren Critics.</p>
22	TEL 302	Telugu culture	2021	<p>1. Understand the Geographical and Historical importance of Andhra.</p> <p>2. Understand the evolution of Andhra Culture since Satavahana period.</p> <p>3. Understand the Customs and Practices of Andhra Life.</p>
23	TEL 303 A	Telugu journalism	2021	<p>1. Understand the system of Mass Communications, its origin and development since ancient days.</p> <p>2. Understand the different channels of Communications, and the role of Communications in Various fields like Socio - Political, Economic, Scientific, Cultural ect.</p>

				3. Understand the importance of Communications in personality development and employment opportunities
24	TEL 303 B	Modern telugu literature	2021	<ol style="list-style-type: none"> 1. Understand the modern Telugu poetry, Novel and Short Stories, 2. Understand the students with the major Trends and Social Movements in Modern Telugu Literature. 3. Understand the students to know the influence of westren Literature on Modern Telugu Literature.
25	TEL 303 C	Telugu feministic literature	2021	<ol style="list-style-type: none"> 1. Understand the emerging trends of Feminism across the world 2. Understand the origin and development of Ferminism movements in Telugu Literature 3. Understand the concepts such as Patriarchy, Gender discrimination, lingustic, Oppression in Socio-Political and economic spheres in the Feminist writings.
26	TEL 303 D	Special study : gurajada apparao	2021	<ol style="list-style-type: none"> 1. Understand the importants of Gurajada and the devotion of Nation, Humanism in his writings. 2. Understand the Special Conditions during the time of Gurajada. 3. Understand the responsiblity in Construction of Modern Society.
27	TEL 304	Personolity development & language skills	2021	<ol style="list-style-type: none"> 1. Understandius soft skills, types of soft skills and intrapersonal skills. 2. Exhibiting different type of people skills. 3. Demonstrating oral communication skills through effective presentations. 4. Exhibiting various modes of written communication. 5. Developing employability skills.
28	TEL 305 A	Introducation of telugu literature	2021	<ol style="list-style-type: none"> 1. Understand all Literory Ages from before Nannaya to modern period. 2. Understand the major Poets and their works in Telugu Literature.

				<p>3. Understand the major Trends in Telugu Literature.</p> <p>4. Understand the various Genres in Classical and Modern Telugu Literature.</p>
29	TEL 305 B	Fundamentals of modern Telugu language	2021	<p>1. Understand the primary features of Telugu Language.</p> <p>2. Understand the Various Forms like Noun, Pronoun ect. in Telugu Language.</p> <p>3. Understand the Syntax of Telugu and Translation.</p> <p>4. Understand the Various types of Writings in Telugu.</p>
30	TEL 401	Modern telugu literary criticism	2021	<p>1. Understand the Modern Literary Criticism in Telugu.</p> <p>2. Understand the Various approaches in Western Literary Criticism.</p> <p>3. Understand the impact of Western Literary Criticism on Telugu Criticism.</p> <p>4. Understand the features of various Telugu Genres in a Critical way.</p>
31	TEL 402	Sanskrit literature and grammar	2021	<p>1. Know about the most ancient Language in the world, Sanskrit.</p> <p>2. Understand the Glory and importance of Sanskrit Literature and Grammar.</p> <p>3. Understand the Vedic literature, and other Ancient Genres in Sanskrit.</p>
32	TEL 403 A	Translation methods	2021	<p>1. Unverstand the different tools, techniques, and methods of Translation.</p> <p>2. Understand the problems and challenges in translation</p> <p>3. Understand to learn translations as a bridge not only between two Languages but also be tween two cultures.</p>
33	TEL 403 B	Research methodology	2021	<p>1. Understand the importance of research work</p> <p>2. Understand how to take the Research Topic</p> <p>3. Understand that how many methods to get information regarding the research work.</p>
34	TEL 403 C	Telugu dalith literature	2021	<p>1. To enable the students to learn the origin and</p>

				<p>the development of caste system in India.</p> <p>2. To introduce the students to the Indian social Darsanaas like Charvaka, Jaina and Boudha.</p> <p>3. To acquaint the students with Dalith Literature in Telugu, some Social events and some of the major Dalith Poets and writers.</p>
35	TEL 403 D	Indian literature	2021	<p>1. familiarise with defferent religions schools of Modran Literature.</p> <p>2. acquaint with different movements and trends is Indian Literature.</p> <p>3. acquaint with comparitive aspects of different Genres is Indian Literature</p>
36	TEL 404	India : philosophical, aesthetical, Sociological & historical studay	2021	<p>1. to introduce the students the knowledge of Various schools of ancient Indian Phylosophy to understand the Indianism.</p> <p>2. To inculcate the students the back ground of some Historics, Sociological movements to understand class & caste systems in India.</p> <p>3. To gain the students the lamparatric Knowledge of Indian Literatures.</p>
37	TEL 405 A	Fundamentals of folk lore	2021	<p>1. Understand the Folk Literature as a popular Art Form in native Languages.</p> <p>2. Understand the rich legacy of Literature in Folk Songs, Folk Performing Arts and other Cultural Artifacts.</p> <p>3. Understand the traditional Values, belifs, customs and devotional methods on rural Goddess ect.</p>
38	TEL 405 B	Telugu nataka sahityam	2021	<p>1. Understand the importance of Special Genre ‘Natakam’ and its features.</p> <p>2. Understand the stages in evolution of ‘Natakam’</p> <p>3. Understand the difference between Natakam (play) and Natika (Play let) by Studying some ‘Natakas’ and ‘Natikas’.</p>

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	URD 101	Mubadiyat-e- Lisaniyat aur Tareeq-e –Zaban-e-Urdu	2021	<p>Course Outcomes:</p> <p>(1) Knowledge of history of basic Urdu Language. (2) Awareness about ancient and modern Indo-Aryan languages. (3) Command over origin and evolution of Urdu language.</p>
2.	URD 102	Dakniyat	2021	<p>Out come</p> <p>(1) Student understands the brief history of Dakani Literature. (2) Student will be able to analyses the writings of Mohd Quli Qutub Shah. (3) Student will learn about the classical genres of Dakani</p>
3.	URD 103	Classiki Nasr	2021	<p>Course Outcomes:</p> <p>(1) Student will be able to understand the early Urdu poetry of Northern India. (2) Understanding the different forms of Urdu Poetry and poets. (3) To knowledge about the distinctive features of Urdu poetry</p>
4.	URD 104	Arabi Zaban-o-Adab	2021	<p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of humor and satire in Urdu literature. (2) Differentiate between satire and humor in text. (3) Analyze the text and identify the elements of satire and</p>
5.	URD 105	Fanne Sher aur Jadeed Asnafa Shairi	2021	<p>Course Outcomes:</p> <p>(1) Able to read, write and understand simple Arabic sentences. (2) Translate simple Arabic sentences. (3) Student will gain brief awareness of Arabic literature</p> <p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of Urdu Qaseeda from Dakani period. (2) Differentiate between the Dakani and Urdu Qaseeda with respect of language, diction and style (3) Understand the salient features of Urdu Qaseeda with special reference to Nusrati, Sauda and Zauq.</p> <p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of Urdu Marsiya. (2) Compare and analyse the Marsiya of Anees and Dabeer.</p>

6.	URD 106	Human Values and Professional Ethics – I	2021	<p>Course Outcomes:</p> <p>(1) Knowledge about tradition of Urdu Drama. (2) Distinguish various forms and techniques of Urdu Drama. (3) Analyses critically the text of Anar kali and Inder Sabha.</p> <p>Course Outcomes:</p> <p>(1) The student would enrich the knowledge about the Urdu poets and writers of Andhra Pradesh and Tamil Nadu. (2) Would understand the features of regional Urdu poets and</p>
7.	URD 107		2021	<p>Course Outcomes:</p> <p>(1) Understand, What are the Human Values accepted globally. (2) Knowing the importance of Human Values in religious scriptures and philosophies</p>
8.	URD 201	Rayalaseema ka Sher-o-Adab	2021	<p>Course Outcomes:</p> <p>(1) Have learn about the important historical events of Urdu Poetry. (2) Have knowledge about the most important schools of thought</p>
9.	URD 202	Classiki Shairi	2021	<p>Out come</p> <p>(1) Student understands the brief history of Dakani Literature. (2) Student will be able to analyze the writings of Mohd Quli Qutub Shah. (3) Student will learn about the classical genres of Dakani literature</p>
10.	URD 203	Hali : Hayat aur Adabi Khidmat	2021	<p>Out come</p> <p>(1) Student will know about the classics of Urdu prose. (2) Student will be able to read and understand the text. (3) Student will learn critical awareness of the text.</p>
11.	URD 204	Farsi Zaban-o-Adab	2021	<p>Out come</p> <p>(1) Student will know about the classics of Urdu prose. (2) Student will be able to read and understand the text. (3) Student will learn critical awareness of the text.</p>

12.	URD 205	Ghair Afsanavi Adab	2021	<p>Course Outcomes:</p> <p>(1) Student will be able to read, write and understand simple persian sentences.</p> <p>(2) Acquire Knowledge about the Persian poetic writings of Sa'di, Hafiz and Iqbal.</p> <p>(3) Student will gain brief awareness of Persian literature.</p> <p>Course Outcomes:</p> <p>(1) Specialized in the life and contributions of Faiz Ahmed Faiz.</p> <p>(2) Identify the uniqueness of the poetry of Faiz Ahmed Faiz.</p> <p>(3) Understanding the salient features of the poetry of Faiz Ahmed Faiz.</p> <p>Course Outcomes:</p> <p>(1) Specialized in the life and contributions of SulaimanAtherJaweed</p>
13.	URD 206 206	Human Values and Professional Ethics –II	2021	<p>Course Outcomes:</p> <p>(1) Awareness of literature written in Rayalaseema.</p> <p>(2) Understand the style of new poets of thisregion.</p> <p>(3) Gain knowledge about two of the pominent prose writers of this area</p> <p>Course Outcomes:</p> <p>(1) Apply the skills of Ilm e bayan and identifying the phrases in poetry</p>
14.	URD 207		2021	<p>Course Outcomes:</p> <p>(1) Awareness about Professional Ethics and its categorization.</p> <p>(2) Understand the importance of Professional Ethics in society.</p> <p>(3) Develop a feeling to become a responsible citizen and a good human being</p>
15.	URD 301	Jadeed Nasr	2021	<p>Course Outcomes:</p> <p>(1) Knowledge about the forms and tradition of Urdu Ghazal.</p> <p>(2) Understanding Dakani Ghazal with reference to eminent Dakani poets.</p> <p>(3) Understanding Classiki Ghazal and Jadeed Ghazal with</p>
16.	URD 302	Jadeed Nazm	2021	<p>Out comes</p> <p>(1) Understanding the forms of Urdu Nazm.</p> <p>(2) Critically estimate and explain the art and technique of famous Urdu poets.</p> <p>(3) Knowledge about the distinctive features Urdu Nazm</p>

17.	URD 303	Urdu Tanqeed	2021	<p>Out come</p> <p>(1) The learner would understand about the mile stones of Urdu Novel.</p> <p>(2) The learner would understand the technical features of Urdu Novel.</p> <p>(3) The learner would understand about the Urdu Novel writers.</p> <p>Out come</p> <p>(1) Knowledge about tradition of Urdu Afsana.</p> <p>(2) Awareness of literary trends and its impact on Urdu Afsana.</p> <p>(3) Identifying and distinguishing the elements in Urdu Afsana</p> <p>Course Outcomes:</p> <p>(1) The learner would understand about the history of computer.</p> <p>(2) The learner would understand the technical features of Urdu computer.</p> <p>(3) The learner would understand about the Urdu DTP.</p> <p>Course Outcomes:</p>
18.	URD 304 A URD 304 B URD 304 C URD 304 D	(a) Sir Syed ka Khusoosi Mutalea (b) Iqbal ka Khusoosi Mutalea (c) Faiz ka Khusoosi Mutalea	2021	<p>Course Outcomes:</p> <p>(1) The learner will know about the aims and objectives of the Journalism.</p> <p>(2) Distinguish between writings of news paper, radio and television.</p> <p>(3) The learner will know about the different fields of Urdu journalism.</p>
19.	URD 305 A URD 305 B URD 305 C	(a) Urdu Ghazal (b) Jadeed Dakani Shairi (c) Urdu Afsana	2021	<p>Course Outcomes:</p> <p>(1) Knowledge about Jadeed Dakani Shairi.</p> <p>(2) Understand Jadeed Dakani Shairi and its vocabulary and diction.</p> <p>(3) Critical awareness about 5 eminent poets of Jadeed Dakani.</p> <p>Course Outcomes:</p> <p>(1) Knowledge about types, techniques and issues of translation.</p> <p>(2) Distinguish between various types of translations.</p> <p>(3) Understand the tradition of Urdu translation and literary</p>

20.	URD 401	Urdu Drama	2021	Course Outcomes: (1) Knowledge of Basic Linguistics. (2) Awareness about ancient and modern Indo-Aryan languages. (3) Command over origin and evolution of Urdu language.
21.	URD 402	Adabi Tehreekat aur Rujhanat	2021	Out comes (1) Knowledge about research, types of research and method of research. (2) Distinguish between various types of research writings. (3) Capable for selection of topic, material collection, designing the research work and writing research paper.
22.	URD 403	Tanz –o- Mizah	2021	Out come (1) Knowledge about Literary criticism. (2) Vies and contributions of Hali and Shibli on literary criticism. (3) Understanding 6 schools of literary criticism. Out come (1) Understand the tradition of Ghari Afsanavi Adab and its salient features. (2) Literary importance of Maktoob Nigare and Inshaiya. (3) Literary importance of Khaka and Safarnama. Course Outcomes: (1) Understand the literary contributions of Altaf Husain Hali. (2) Importance and salient features of Mussadas, Muqaddama & Maqalat. (3) Understand the writing style of Hali as a biographer Course Outcomes: (1) Knowledge about form and tradition of Urdu Ghazal.
23.	URD 404 A URD 404 B URD 404 C URD 404 D	(a) Urdu Tarjuma Nigari (b) Urdu Marsiya (c) Urdu Khudnavisht	2021	Outcomes: (1) Able to know the history and trends of Telugu, Hindi and English languages. (2) Gain the comparative knowledge of various languages and their literature

24.	URD 405 A URD 405 B URD 405 C	(a) Ibtdayi Urdu (b) Tehqeeq - Tariqekar (c) Urdu Qaseeda	2021	Course Outcomes: (1) Specialized in the contributions of Sir Syed Ahmed Khan. (2) Contributions of Sir Syed Ahmed Khan, as literary person and as a educationist. (3) Understanding the contributions of his literary friends Course Outcomes: (1) Specialized in the contributions of Sir Mohammed Iqbal. (2) Contributions of Allama Iqbal with reference to Bal e Jibreel.
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S.V.U. College of Sciences

28. Anthropology

S. No.	Name of the Programme	Course Code	Title of the Course	Years	Course Outcomes
1	M.Sc. Anthropology	ANO : 101	Introduction to Biological Anthropology	2021	a. Exposed to the basic concept, meaning and scope of Biological Anthropology b. Explain how human being acts as the central figure of Anthropology c. Elucidate the major divisions of Biological/ physical Anthropology d. Know the inter-relationship between Biological Anthropology and other sciences e. To know how Man evolved in animal kingdom f. To understand how evolution has occurred and what are the evidences of evolution and addresses human variation and the causes of variations
2	M.Sc. Anthropology	ANO : 102	Introduction to Social Cultural	2021	a. Exposed to the basic introductory

			Anthropology		<p>background about Socio-cultural Anthropology, its historical background and relation to other branches</p> <p>b. Provides knowledge about the entire subject matter of the socio-cultural anthropology as well as its different sub-branches.</p> <p>c. Exposed to social institutions</p> <p>d. Know the religion beliefs, rituals and myth</p>
3	M.Sc. Anthropology	ANO-103	Introduction to Archaeological Anthropology	2021	<p>a. Able to define archaeological anthropology and its branches</p> <p>b. Understand the geological timescale, tool typology and technology</p> <p>c. The Course will explain the basic concepts and terminology used in prehistoric archaeology</p> <p>d. Understand chronological and cultural determinants of Indian and European prehistory</p>
4	M.Sc. Anthropology	ANO-104	Indian Anthropology		<p>a. Exposed to diversified linguistic, Political , ethnic, communal and religious tensions and conflicts national integration.</p> <p>b. Understand the social structure and lifecycle patterns of different past societies</p> <p>c. Understand the caste and varna systems. Learn the major contributions of different Indian Anthropologists to Anthropology</p>
5	M.Sc. Anthropology	ANO-105	Social Problems and Anthropology		<p>a. Exposed to eco-systems, symbiosis</p>

					<p>and homeostasis.</p> <p>b. Know about the shifting cultivation and ecological in balance</p> <p>c. Understand the problems and perspectives of Indian peasantry</p> <p>d. Understand the family, Kinship and caste system in India</p>
6	M.Sc. Anthropology	ANO 106	Economic and Political Anthropology	2021	<p>a. Able to learn meaning and scope of economic anthropology</p> <p>b. To understand the division of labor by gender and age, exchange of goods and gifts, and to understand the market economy.</p> <p>c. Able to know the historical background of Political Organization besides types and trends of Political Organization including types like i.e. Band, Tribe, Chiefdoms and State</p> <p>d. To know the local institutions: panchayats (traditional and statutory)</p>
7	M.Sc. Anthropology	ANO 107	Human Ecology	2021	<p>a. Exposed to the various ecological settings of human habitat .</p> <p>b. Know the ecological evaluation and adaptation.</p> <p>c. To understand the growth and development in various eco-systems</p> <p>d. Understand the Differential Fertility and Mortality, Survival Indices, quality of Life and Fitness.</p>
8	M.Sc. Anthropology	ANO 108	Tribal Development in India	2021	<p>a. Exposed to the various constitutional safeguard for schedule tribes.</p> <p>b. To understand the various tribal sub planes.</p>

					<ul style="list-style-type: none"> c. To know the National Commission for STs, Tribal Advisory Council, Tribal Welfare Department d. To understand the implementation of developmental initiatives
9	M.Sc. Anthropology	ANO 201	Comparative Ethnography and Indian Anthropology	2021	<ul style="list-style-type: none"> a. To understand the major ethnological regions of the world b. To know the ethnic and linguistic classifications c. Able to understand the traditional Indian culture d. To know the contributions of Indian anthropologists
10	M.Sc. Anthropology	ANO 202	Principals of Genetics	2021	<ul style="list-style-type: none"> a. understand about the scope of genetics and its historical development b. to learn the biology of cell and cell division c. Exposed to the patterns of the inheritance d. Know about blood groups and their anthropological perspective
11	M.Sc. Anthropology	ANO203	Prehistoric India	2021	<ul style="list-style-type: none"> a. learn the regional distribution of lower, middle, and upper Paleolithic cultures b. To learn the Mesolithic culture and typo- technology c. Learn the regional distributions of Neolithic cultures d. understand the copper and iron age e. exposed to the distribution of megaliths
12	M.Sc. Anthropology	ANO204	Urban Anthropology	2021	<ul style="list-style-type: none"> a. Exposed to the history of urbanization. b. Understand the environment and ecological processes of urban c. Understand the urbanization and

					<p>industrialization on cultural complexity</p> <p>d. Understand the relevance of anthropology to urban industry, Business and Corporate Sectors; Urbanization and Social Change in India.</p>
13	M.Sc. Anthropology	ANO205	Fieldwork Traditions	2021	<p>a. Exposed to the various field work approaches.</p> <p>b. Know the ethnography, case study and survey methods.</p> <p>c. To understand the participatory rural appraisal (PRA) in India</p> <p>d. Understand the developmental tourism,.</p>
14	M.Sc. Anthropology	ANO 206	Research Methods in Anthropology	2021	<p>a. To understand the fieldwork traditions in Anthropology</p> <p>b. To understand the concept of research and its purpose</p> <p>c. highlight the conceptual structure of a research design</p> <p>d. understand the various statistical tools in the analysis and interpretation of the data</p>
15	M.Sc. Anthropology	ANO 207	Biology, Health and Disease	2021	<p>a. Exposed to the reproductive health problems and its impact women's health</p> <p>b. To know the Balanced diet, malnutrition, under nutrition Nutritional status and susceptibility to infectious diseases</p> <p>c. Learn about different diseases due to pollution and health hazards</p>

					d. Understand the problems of ageing and longevity in India.
16	M.Sc. Anthropology	ANO 208	Early Civilizations	2021	<ul style="list-style-type: none"> a. Understand the Factors Contributing to the Emergence of Civilization and Urbanization. b. To Know about the Indus valley civilizations. c. Exposed to early civilizations of west Asia d. d.To know the early civilizations in China, South east Asia and in new world.
17	M.Sc. Anthropology	ANB 301	Human Evolution and Fossil Evidence	2021	<ul style="list-style-type: none"> a. Understand the evolutionary trends of primates, prosimianms to homosapiens b. To know the hominid evolution c. To know the Neanderthals distributions and extension d. Exposed to the homo sapiens distribution and feature of human species
18	M.Sc. Anthropology	ANB 302	Human Genetics	2021	<ul style="list-style-type: none"> a. understand the meaning and scope of human genetics b. know methods of studying human chromosomes and chromosomal abnormalities c. depict Inborn errors of metabolism with typical examples and human human ABO blood group system and its fundamentals d. know the concept of “one-gene-one-enzyme hypothesis” which explains development of genetic

					diseases/disorders caused by defective genes controlling the functions of enzymes in metabolic pathways
19	M.Sc. Anthropology	ANB 303	Anthropological Demography	2021	<ul style="list-style-type: none"> a. Know about the different population growth theories b. Learn the basic demographic variables c. Understand how the different factors regulates the population growth d. Understand the different demographic models e. Learn the genetic consequences of family planning
20	M.Sc. Anthropology	ANB 304	Forensic Anthropology	2021	<ul style="list-style-type: none"> a. able to know about forensic anthropology, a specialized, applied branch of physical/biological anthropology which deals with the crime investigation b. understand how dermatoglyphic, somatoscopic characteristics and body fluids helpful in crime investigation c. know the use of skeletal remains in forensic investigations d. know the importance of modern methods in crime investigation
21	M.Sc. Anthropology	ANB 305	Epidemiology and Public Health	2021	<ul style="list-style-type: none"> a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health. b. Understand the global burden of health outcomes and diseases by assessing measures and interpret the prevalence, risk, rate, and odds within the context of epidemiology

					<ul style="list-style-type: none"> c. Know about Complications of obesity on health its prevention and control d. Understand the complex web of biological, behavioral, cultural and environmental factors towards the prevalence of communicable infections and chronic infections
22	M.Sc. Anthropology	ANB 307	Biostatistics and Computer Applications	2021	<ul style="list-style-type: none"> a. To understand the concept of research and its purpose b. To enlighten the process of research and conceptual structure of a research design c. Understand the disease outcomes through measurement of descriptive, analysis of variance and regression models through computer applications d. Know the use of computers in the analysis data and power point presentation
23	M.Sc. Anthropology	ANB 308	Palaeoanthropology	2021	<ul style="list-style-type: none"> a. understand the geological time scale and Pleistocene epoch b. know about tool making techniques and tool types c. gain knowledge about dating methods d. learn about Paleolithic, Mesolithic and Neolithic cultures in India
24	M.Sc. Anthropology	ANB 309	Fundamentals of Anthropology	2021	<ul style="list-style-type: none"> a. Understand the meaning, scope and relation with other branches of Biological Anthropology. b. Understand the meaning, scope and relation with other branches of Socio-Cultural Anthropology. c. Understand the meaning, scope and relation with other branches of Archeological Anthropology

					d. Exposed to race, ethnicity and racial classification
25	M.Sc. Anthropology	ANB 401	Biological Anthropology	2021	<ul style="list-style-type: none"> a. Understand the basic concept, meaning and scope of Biological Anthropology b. Know the biological variation in modern human populations c. Understand the human adaptability and impact of urbanization on humans d. Bio-cultural aspects of health and disease
26	M.Sc. Anthropology	ANB-402	Human Population Genetics	2021	<p>Students will</p> <ul style="list-style-type: none"> a. Explain the basic terms/concepts of human population genetics b. Appreciate the mechanisms of evolutionary forces in shaping biological diversity c. Understand the importance of Hardy – Weinberg Equilibrium especially the gene frequency changes with respect to Mutation, Genetic drift, Selection, Gene flow and to investigate them in empirical situations in human populations d. Know about breeding isolation and its implications in human population genetics. e. Understand various mating patterns (inbreeding and types of consanguineous marriages) and measure the inbreeding in families
27	M.Sc. Anthropology	ANB -403	Human Growth, Physique and Nutrition	2021	<ul style="list-style-type: none"> a. Know about the Differentiate the term growth, maturation and development

					<ul style="list-style-type: none"> b. To learn the methods of studying growth and the factors affecting the growth c. To understand the Human Physique and its Relation of Function, Disease and Behavior. d. Know the socio-cultural aspects of nutrition and nutrients in health and diseases
28	M.Sc. Anthropology	ANB -404	Applied Biological Anthropology	2021	<ul style="list-style-type: none"> a. Know about various applications of anthropometry and kinanthropometry in various fields b. Understand about the importance of forensic anthropology in crime investigations c. Know the importance genetic counseling, genetic screening, Genetic engineering, treatment of genetic diseases and Gene therapy d. Learn about the human geno project
29	M.Sc. Anthropology	ANB -405	Medical Genetics		<ul style="list-style-type: none"> a. Understand the overplating areas of anthropology and genetics, anthropology and medicine (Disease) b. Understand the different methods of identification genetic diseases c. Know about epidemiology, socio cultural and ecological dimensions of genetic diseases control and treatment Learn the knowledge, attitude and currying practices of genetic diseases
30	M.Sc. Anthropology	ANB-408	Epidemiology	2021	<ul style="list-style-type: none"> e. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health. f. Understand the global burden of health outcomes and diseases by assessing measures and interpret the

					<p>prevalence, risk, rate, and odds within the context of epidemiology</p> <p>g. Know about Complications of obesity on health its prevention and control</p> <p>h. Understand the complex web of biological, behavioral, cultural and environmental factors towards the prevalence of communicable infections and chronic infections</p>
31	M.Sc. Anthropology	ANB -409	Applied Biological Anthropology	2021	<p>e. Know about various applications of anthropometry and kinanthropometry in various fields</p> <p>f. Understand about the importance of forensic anthropology in crime investigations</p> <p>g. Know the importance genetic counseling, genetic screening, Genetic engineering, treatment of genetic diseases and Gene therapy</p> <p>h. Learn about the human geno project</p>
32	M.Sc. Anthropology	ANS 301	Theories of Culture	2021	<p>a. Understand the Conceptual Contributions of E. B. Tylor, B. Malinowski, A. L. Kroeber, L. White, Unilineal Evolution (L. H. Morgan and E. B. Tylor); Multilineal Evolution (J. Steward); Universal Evolution (L. White)</p> <p>b. To know the British School; German-Austrian School; American – Distribution School of culture</p> <p>c. Know the Patterns of Culture (R. Bendict); Basic Personality, Model Personality (Kardiner, Linton, Cora Dubois); Selfhood (Murphy); Symbolic (G. Obeysekere)</p> <p>d. understand the historical approaches</p>

					of culture
33	M.Sc. Anthropology	ANS 302	Social Anthropology of Complex Societies	2021	<ul style="list-style-type: none"> a. Learn the meaning and approach of great and little traditions b. learn about the peasant societies and contemporary peasant societies c. know the culture of poverty, institution and complex societies d. understand problems of urbanization and social changes
34	M.Sc. Anthropology	ANS 303	Ecological Anthropology	2021	<ul style="list-style-type: none"> a. Understand the environment and ecosystem in understanding the cultural modifications b. Know about the cultural ecology, cognitive ecology, single unified ecology, and ethno ecology. c. Learn issues and prospects on development projects and displacement d. Understand Biodiversity for sustainable development Knowabout Ecological protest movements (Chipko and Narmada Bachao Andolan (NBA));
35	M.Sc. Anthropology	ANS 304	Applied Anthropology- Indigenous Communities	2021	<ul style="list-style-type: none"> a. Know the Similarities and Differences between Applied and Action Anthropology, Indigenous communities and applied anthropology. Indigenous rights. b. Know the process of acculturation and assimilation, socialization c. Know about applications of Anthropology in the management of health, agriculture, education and biodiversity and poverty eradication d. Gain the knowledge on tribal welfare, tribal problems, forest and property rights, shifting cultivation and tribal

					movements
36	M.Sc. Anthropology	ANS 305	Anthropology of Religion Sacred complexes in India	2021	<ul style="list-style-type: none"> a. Know about meaning and relation with power and political leverages, ethnic identity and other aspects of culture in tradition and modern societies b. Know the different anthropological theories of religion c. Know the issues of right of food among by Hindus, five symbols of sikh identity, Aspects of sarora ritual and Shamansism, and Christianity in India d. To understand Contemporary issues of religious violence, secularism and fundamentalism
37	M.Sc. Anthropology	ANS307	Data Management and Computer Applications	2021	<ul style="list-style-type: none"> a. Know about data Collection entry and management. b. Understand the M.S. Office. c. Exposed in using the SPSS in preparing charts and various advanced statistics d. Understand the excel package in using data analysis
38	M.Sc. Anthropology	ANS 308	Anthropology and Career Promotion	2021	<ul style="list-style-type: none"> a. Understand the anthropology in competitive examinations b. Know about participatory research appraisal c. Exposed to the issues in tribes, tribal problems and cast populations d. Learn the books to be consulted, review of questions and scheme of valuation

39	M.Sc. Anthropology	ANS 309	Tribal Studies	2021	<ul style="list-style-type: none"> a. Understand the classification and distribution of tribes b. Know the tribal problems like Land Alienation, Indebtedness, Migration, and Cultural Degradation. c. To know the shifting cultivation, tribal education and tribal health d. To know the Fifth and Sixth Schedules Constitutional safeguards
40	M.Sc. Anthropology	ANS 401	Structural Anthropology	2021	<ul style="list-style-type: none"> a. Know the social structure and function of culture b. Understand about the ideal and real social structure and social organization c. Know the general notion of structuralism d. Learn the symbols and structure
41	M.Sc. Anthropology	ANS -402	Developmental Anthropology	2021	<ul style="list-style-type: none"> a. Know about the Concept of Development and Sustainable Development b. Understand the steps in project preparation, goals, process of implementation and monitoring. c. Role of government, NGOs and peoples participation in development d. Know the watershed management and irrigation, resettlement,(Narmada) poverty Alleviation (Velugu); Primary Education (VECs
42	M.Sc. Anthropology	ANS-403	Medical Anthropology	2021	<ul style="list-style-type: none"> a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health.

					<ul style="list-style-type: none"> b. Understand the etiology, control of infections and non-infections diseases c. Understand the ethno-medicine in the management of health and illness behavior d. Understand the modern medical systems and health care delivery services
43	M.Sc. Anthropology	ANS 404	Culture and Management	2021	<ul style="list-style-type: none"> a. Know the concept of organizational culture. Its links with cultural anthropology Organizational ethnography. Anthropology of work b. Understand the Theories of organizational culture. Different anthropological traditions c. Know the How culture affect management Changes in management styles Future outlook. d. To understand the Ethno methodological approaches, Organizational symbolism. Integration, differentiation and fragmentation as three perspective approaches to organizational culture
44	M.Sc. Anthropology	ANS 405	Anthropology of Displaced Populations	2021	<ul style="list-style-type: none"> a. Know the peoples perception towards development and displacement b. Understand the role of government and non-government agencies in the process of displacement, resettlement and rehabilitation. c. Understand policy issues relating development and displacement in legal implications of displacement and rehabilitation d. Learn the Socio-Cultural effects of displacement, Socio disorganization,

					process of disintegration and reintegration
45	M.Sc. Anthropology	ANS-408	Visual Anthropology	2021	<ul style="list-style-type: none"> a. Know about the concept, scope and Historical Development of visual anthropology b. Know about the appraisal of ethnographic films in cultural context c. Knowledge about descriptive studying of Visual data produced by Cultures d. To understand the ethnographical films, still photos film shootings and commentary
46	M.Sc. Anthropology	ANS -409	Environmental Anthropology	2021	<ul style="list-style-type: none"> a. Know the meaning and scope ecosystem of homeostases, ecological niche and ecosystem development b. Understand the various theoretical formulations c. Understand Biodiversity for Sustainable Development; Development Projects (Hydro-electric, Irrigation Projects and Industries) and Displacement. d. Exposed to the different ecological issues and environmentalism towards development

30. Biochemistry

S.No.	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	BCH101	Biochemical and Biophysical methods	2021	1. Understand the principle, Instrumentation of different types of Light microscope Centrifugation and its applications in various fields of research.

				<ol style="list-style-type: none"> Learn about basic Radioactivity principles, measurement method and its biological applications. Acquire knowledge about the basics and latest developments in the instrumentation (PAGE) and Chromatography and their applications in various research fields. Demonstrate skill to explain about principle, Bioinstrumentation and applications.
2	BCH 102	Molecular Physiology and community nutrition	2021	<ol style="list-style-type: none"> Gain the knowledge about circulatory and excretory systems. Know the importance of muscular and nervous system. Health benefits and malnutrition of proteins and fats. Know the importance of nutrition in maintenance of health and diseases.
3	BCH 103P	Practical related to Biochemical Preparations and Analysis	2021	<ol style="list-style-type: none"> Learn safety and precautionary measures for working in a laboratory. Develop skill and proficiency in preparation of laboratory reagents and equipment for conducting experiments. Acquire practical training for qualitative and quantitative analysis of biological samples and estimation using multiple methods. Gain the knowledge about isolation studies of biological samples.
4	BCH 104P	Practical related to Analytical methods	2021	<ol style="list-style-type: none"> Learn how to standardize various biomolecules. Separate biomolecules by paper chromatography and thin layer chromatography. Demonstrate separation of protein by electrophoresis. Isolation and spectrophotometric characterization of plant pigments.
5	BCH 105P	Human values and Professional ethics-I	2021	<ol style="list-style-type: none"> Easily understand the Need and Importance of Professional Ethics- Goals- Ethical standards. Analyse the basic moral concepts- right, ought, duty, obligation, justice, responsibility. Know about Purusharthas, Dharma, Artha, Kama, Moksha. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavratas and Gandhian values. Gain the knowledge about views on Manu and Yajnavalkya.
6	BCH 106	Cell and Biomolecules	2021	<ol style="list-style-type: none"> Easily understand the difference between prokaryotic and eukaryotic cells, and their characteristics. Understand the classification, structure and biochemical reactions of amino acids. Describe the classification, structure and biochemical reactions of carbohydrates. Understand the concept of structural organization of nucleic acids.
7	BCH 201	Energy metabolism	2021	<ol style="list-style-type: none"> Explain the broad outlines of intermediary metabolism and importance of carbohydrates. Describe the importance of Electron transport and ATP production mechanism. Gain in knowledge in Carbohydrate metabolism and their associated disorders. Describe the details of lipid metabolism.
8	BCH 202	Metabolism of Nitrogen based molecules	2021	<ol style="list-style-type: none"> Understand the anabolic and catabolic reactions of proteins and amino acids. Gain knowledge in the importance of amino acids as biosynthetic precursors.

				<ol style="list-style-type: none"> 3. Know the biosynthesis and degradation of purine and pyrimidines and their associated enzymes. 4. How toxic chemicals are metabolised by the body through detoxification and the mechanism.
9	BCH 203P	Practical related to Enzymology	2021	<ol style="list-style-type: none"> 1. Learn about estimation of various enzymes in biological sample. 2. Learn to perform assay of clinically important enzyme: serum acid and alkaline phosphatase. 3. Learn about the factors affecting enzyme activity and determination of Km. 4. Demonstrate the Immobilization of enzymes.
10	BCH 204P	Practical related to Molecular Biology	2021	<ol style="list-style-type: none"> 1. Isolate nucleic acids from various sources. 2. Estimate the nucleic acids quantitatively. 3. Determine the melting temperature. 4. Determine the purity of DNA by UV method.
11	BCH 205	Human values and Professional ethics-II	2021	<ol style="list-style-type: none"> 1. Easily understand the Components, Structure and responsibilities of family and society. 2. To get an idea on Ethical issues in relation to health care professionals and public health. 3. To know about Characteristics of ethical problems in management, ethical theories, and their abuses and work ethics. 4. Understand the Ethical theory, Ecological crisis, Pest control, Pollution and its impact on population. 5. Gain the knowledge about Organ trade, Human trafficking, Human rights violation, Surrogacy/ pregnancy.
12	BCH 206	Enzymology	2021	<ol style="list-style-type: none"> 1. Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and classification. 2. Describe the concepts of enzyme inhibition and mechanism of enzyme catalysis. 3. Students will acquaint with mechanism of enzyme action and various coenzymes and cofactors taking place in living systems. 4. Describe the concepts of co-operative behavior and allosteric regulation.
13	BCH 301	Microbial Biochemistry and Genetics	2021	<ol style="list-style-type: none"> 1. Understand the basics of microbiology like nomenclature and classification of microorganisms and biological and non-biological methods to control microorganisms. 2. The student will learn about different modes of nutrition in microorganisms and their characteristics. 3. Understand the basics of genetics and the gene arrangement in prokaryotes and eukaryotes. 4. Gain knowledge in bacterial genetics includes the different types of plasmids, recombinant DNA technology, bacterial defense mechanism (CRISPR) and Describe the various types of mutations.

14	BCH 302	MolecularBiology	2021	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learnabout the mechanism and regulation of transcription in prokaryotes and euk 3. Learnabout genetic code and their evolution. 4. Gain knowledge in Different stages and components of protein synthesis.
15	BCH 303P	PracticalrelatedtoMicrobiolog y	2021	<ol style="list-style-type: none"> 1. Handle the microscope. 2. Learn Methods of sterilization and preparation of various culture media, Purific 3. Identification of isolated bacteria, and Growth curve of microorganism. 4. Learn Staining techniques for bacteria and yeast. 5. Gain knowledge in the Preparation of wine from Grapes. 6. Production and estimation of alcohols, citric acid, lactic acid etc.
16	BCH 304P	PracticalrelatedtoClinicalBioc hemicalAnalysis	2021	<ol style="list-style-type: none"> 1. Collect and maintain the biological samples for clinical assay. 2. Estimate the blood and serum enzymes for diagnosis of diseases. 3. Qualitatively analyse the abnormal constituents in urine. 4. Work with diagnostic kits
17	BCH305 GenericEle ctive(Twop apersoutoft hree)	<ol style="list-style-type: none"> a) MolecularEndocrinology b) ClinicalBiochemistry CellandDevelopmentalBiolog y 	2021	<ol style="list-style-type: none"> 1. Know about the mechanism of action of different hormones secreted by hypoth 2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and 3. Know about the mechanism of action of insulin, glucagon and many gastro inte 4. Acquire knowledge on Hormonal regulation of menstrualcycle anddisordersass
18	BCH 305 B	Clinical Biochemistry	2021	<ol style="list-style-type: none"> 1. Maintain clinical biochemistry laboratory, biological specimen collection for clin associated with carbohydrates. 2. Learn and understand the Inborn errors of amino acid metabolism, Lipid metabol 3. Gain knowledge in clinical enzymology and Disorders of Gastrointestinal Tract. 4. Investigate the serum enzymes in liver
19	BCH-305c	CellandDevelopmentalBio logy	2021	<ol style="list-style-type: none"> 1. Acquire knowledge on basic concepts of Developmental Biology. 2. Gain the proficient knowledge about zygote formation, blastula formation, development. 3. Understand Organogenesis, limb development and regeneration in vertebrate animals and Plant tissue culture, Protoplast fusion and Production of transgenic p 4. Acquire knowledge about biomembrane concept and various membrane transport
20	BCH306 OpenElecti ve toothers	a) GeneralBiochemistry	2021	<ol style="list-style-type: none"> 1. Understand the classification, structure and biochemical reactions of aminoac 2. Describe the classification, structure and biochemical reactions of carbohydr 3. Understand the concept of structural organization of nucleic acids. <ol style="list-style-type: none"> 1. Describe the Structureofporphyrins, Chemistry and functions of waterandfat

		b)Environmental Biochemistry		<ol style="list-style-type: none"> 2. Students will be able to know how to conserve natural resources for future. 3. Students will be able to describe differing types of <i>ecosystems</i> and their characteristics. 4. Gain the knowledge about different types of pollution in the environment. 5. Know the Relation between human population and environment. <ol style="list-style-type: none"> 1. Understand the principle, Instrumentation of different types of Light microscope, Centrifugation and its applications in various fields of research. 2. Learn about basic Radioactivity principles, measurement method and its biological applications. 3. Acquire knowledge about the basics and latest developments in the instrumentation (Electrophoresis, 2D PAGE) and Chromatography and their applications in various research fields. 4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques.
		c)Experimental aspects related to analytical methods		
21	BCH401	Genetic Engineering	2021	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes. 2. Understand the mechanisms of regulation of gene expression in different operons. 3. Know the techniques for transfer and expression of cloned gene and its applications. 4. Apply the knowledge of genetic engineering in biological research. 5. Understand the principle, Bioinstrumentation and applications of spectroscopy techniques.
22	BCH402	Technical Writing, Biostatistics and Bioinformatics	2021	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about biological data and database search tools. 4. Acquire hands on training on various computational tools and techniques employed in biological research.
23	BCH403P	Practical related to Immunology and Hematology	2021	<ol style="list-style-type: none"> 1. Collect the blood samples and handle the microscope. 2. Analyze the blood samples. 3. Expert in immunodiffusion and immunoelectrophoresis techniques.
24	BCH404P	Practical/Project work	2021	
25	BCH405	a) Immunology	2021	<ol style="list-style-type: none"> a. Gain knowledge on different types of antigens, antibodies and how different types of antigens interact with antibodies.

	Generic Elective			<ul style="list-style-type: none"> b. Out line, compare and contrast the key mechanism of innate and adaptive immunity. c. Gain knowledge on undesirable immunological reactions and their complications. d. 4. Apply knowledge in disease diagnosis through serological tests. <ul style="list-style-type: none"> 1. Gain knowledge in Fermentation Technology and industrial production of chemicals. 2. Learn Industrial application of Enzyme Technology. 3. Gain knowledge in Applications of hybridoma technology. 4. Understand the applications of genetic engineering in biotechnology and Genetic Engineering. 5. Understand the Structure, function and mechanisms of action of phytochromes, gibberellins, ethylene, auxin, cytokinins, abscisic acid, brassinosteroids, jasmonic acid, salicylic acid, and ethylene. <ul style="list-style-type: none"> 1. Gain knowledge in special features of secondary plant metabolism. 2. Know the evolutionary studies Origin of basic biological molecules. 3. Understand the Concepts of natural evolution and population genetics.
26	BCH406 Open Elective toothers (For other department students)	<ul style="list-style-type: none"> b) Applied Biochemistry c) Plant Biochemistry 	2021	<ul style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about Biological data and database search tools. 4. Acquire hands on training on various computational tools and techniques employed in bioinformatics. <ul style="list-style-type: none"> 1. Maintain clinical biochemistry laboratory, biological specimen collection for clinical diagnosis associated with carbohydrates. 2. Learn and understand the Inborn errors of amino acid metabolism, Lipid metabolism and porphyrias. 3. Gain knowledge in clinical enzymology and Disorders of Gastrointestinal Tract.

		b) Biochemistry of diseases		4. Investigate the serum enzymes in liver diseases
27		C) Nutritional Biochemistry	2021	<ol style="list-style-type: none"> 1. Determine the body composition and body weight by using various methods. 2. To describe the importance of protein and fats. 3. Gain knowledge on vitamins and minerals to maintain health. 4. Acquire knowledge on nutritional importance in different ages in the life

Immuno technology

S.No.	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	Core1	Biochemical and Biophysical methods	2021	<ol style="list-style-type: none"> 1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research. 2. Learn about basic Radioactivity principles, measurement method and its biological applications. 3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields. 4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques
2	Core2	Molecular Physiology and community nutrition	2021	<ol style="list-style-type: none"> 5. Gain the knowledge about circulatory and excretory systems. 6. Know the importance of muscular and nervous system. 7. Health benefits and malnutrition of proteins and fats. 8. Know the importance of nutrition in maintenance of health and diseases
3	Core3P	Practical related to Preparations and Analysis	Biochemical 2021	<ol style="list-style-type: none"> 1. Learn safety and precautionary measures for working in a laboratory. 2. Develop skill and proficiency in preparation of laboratory reagents and Use of handling of glass wares, minor equipment for conducting experiments 3. Acquire practical training for qualitative and quantitative analysis of biological materials/molecules and their estimation using multiple

				<p>methods.</p> <p>4. Gain the knowledge about isolation studies of biological samples.</p>
4	Core4P	Practical related to Analytical methods	2021	<ol style="list-style-type: none"> 1. Learn how to standardize various biomolecules. 2. Separate biomolecules by paper chromatography and thin layer chromatography 3. Demonstrate separation of protein by electrophoresis. 4. Isolation and spectrophotometric characterization of plant pigments
5	Compulsory Foundation	Cell and Biomolecules	2021	<ol style="list-style-type: none"> 6. Easily understand the difference between prokaryotic and eukaryotic cells, and the concept of cell division. 7. Understand the classification, structure and biochemical reactions of amino acids and proteins. 8. Describe the classification, structure and biochemical reactions of carbohydrates and lipids. 9. Understand the concept of structural organization of nucleic acids.
6	Elective foundation	Human values and Professional ethics-I	2021	<ol style="list-style-type: none"> 10. Easily understand the Need and Importance of Professional Ethics- Goals- Ethical Values in various Professions. 11. Analyse the basic moral concepts- right , ought, duty, obligation, justice, responsibility and freedom. 12. Know about Purusharthas, Dharma, Artha, Kama, Moksha. 13. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavratas and anuvratas. 14. Gain the knowledge about views on Manu and Yajnavalkya.
7	Core1	Energy metabolism	2021	<ol style="list-style-type: none"> 1. Explain the broad outlines of intermediary metabolism and importance of carbohydrate metabolism in life. 2. Describe the importance of Electron transport and ATP production mechanism. 3. Gain in knowledge in Carbohydrate metabolism and their associated disorders. 4. Describe the details of lipid metabolism.
8	Core2	Metabolism of Nitrogen based molecules	2021	<ol style="list-style-type: none"> 1. Understand the anabolic and catabolic reactions of proteins and amino acids. 2. Gain knowledge in the importance of amino acids as biosynthetic precursors.

				<p>3. Know the biosynthesis and degradation of purine and pyrimidines and their associated disorders.</p> <p>4. How toxic chemicals metabolised by the body through detoxification and the mechanism of carcinogenicity.</p>
9	Core3	Practical related to Enzymology	2021	<p>5. Learn about estimation of various enzymes in biological sample.</p> <p>6. Learn to perform assay of clinically important enzyme: serum acid and alkaline phosphatase, serum LDH.</p> <p>7. Learn about the factors affecting enzyme activity and determination of K_m.</p> <p>8. Demonstrate the Immobilization of enzymes</p>
10	Core4	Practical related to Molecular Biology	2021	<p>1. Isolate DNA from bacterial, plant and animal cells and RNA from yeast cells.</p> <p>2. Estimate concentrations of DNA and RNA by conventional methods and UV absorption methods.</p> <p>3. Determine the melting temperature (T_m) of DNA.</p> <p>4. Learn procedures for isolation of phage M_{13} and single and double standard M_{13} DNA.</p>
11	Compulsory Foundation	Enzymology	2021	<p>1. Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms.</p> <p>2. Describe the concepts of enzyme inhibition and mechanism of enzyme catalysis.</p> <p>3. Students will acquaint with mechanism of enzyme action and various coenzymes involved in the biochemical reactions taking place in living systems.</p> <p>4. Describe the concepts of co-operative behaviour and allosteric regulation</p>
12	Elective foundation	Human values and Professional ethics-II	2021	<p>6. Easily understand the Components, Structure and responsibilities of family and status of women in family and society.</p> <p>7. To get an idea on Ethical issues in relation to health care professionals and patients and genetic engineering, Social justice in health care, Human cloning.</p> <p>8. To know about Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.</p> <p>9. Understand the Ethical theory, Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population.</p> <p>10. Gain the knowledge about</p>

				Organtrade, Humantrafficking, Humanrights violation and social disparities, Feminist ethics, Surrogacy/ pregnancy
13	Core1	Microbial Biochemistry and Genetics	2021	<ol style="list-style-type: none"> 1. Understand the basics of microbiology like nomenclature and classification of microorganisms and different modes of nutrition in microorganisms. 2. Learn and understand the various biological and non-biological methods to control microorganisms and Biology of subviral agents – Viroids, Prions, Satellite viruses. 3. Understand the basics of genetics and the gene arrangement in prokaryotes and eukaryotes. 4. Gain knowledge in bacterial genetics like different types plasmids, recombination in bacteria, bacteriophages and bacterial defense mechanism (CRISPR) and various types of mutations and their effects
14	Core2	Immunology	2021	<ol style="list-style-type: none"> 1. Gain knowledge on different types of antigens, antibodies and how different types of antibodies are produced. 2. Out line, compare and contrast the key mechanism of innate and adaptive immunity 3. Gain knowledge on undesirable immunological reactions and their complications in health management 4. Apply knowledge in disease diagnosis through serological tests
15	Core3	Practical related to Microbiology	2021	<ol style="list-style-type: none"> 1. Handle the microscope. 2. Learn Methods of sterilization and preparation of various culture media, Purification techniques. 3. Identification of isolated bacteria, and Growth curve of microorganism. 4. Learn staining techniques for bacteria and yeast. 5. Gain knowledge in the Preparation of wine from Grapes. 6. Production and estimation of alcohols, citric acid, lactic acid etc
16	Core4	Practical related to Immunology	2021	<ol style="list-style-type: none"> 1. Perform RBC, WBC count and differential count. 2. Do all haematological tests that will be done in clinical labs. 3. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc. 4. Do Heme agglutination tests for identification of different antigens
17	Generic Elective (Two papers out of	a) Molecular Biology	2021	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication.

	three)			<ol style="list-style-type: none"> 2. Learn about the mechanism and regulation of transcription in prokaryotes and eukaryotes. 3. Learn about genetic code and their evolution. 4. Gain knowledge in Different stages and components of protein synthesis
		b)MolecularEndocrinology		<ol style="list-style-type: none"> 1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands. 2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands. 3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones. 4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones.
		c)Cell and Developmental Biology		<ol style="list-style-type: none"> 1. Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion, Apoptosis, Senescence, integrins. 2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development. 3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants. 4. Gain knowledge about Miscelle, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis.
18	Open Elective to others (For other department students)	a) Basics of Immunology	2021	<ol style="list-style-type: none"> 1. Gain knowledge on essential features of different types of antigens, antibodies. 2. Out line, compare and contrast the key mechanism of innate and adaptive immunity. 3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation. 4. Apply knowledge in disease diagnosis through serological tests.
		b) Immunotechniques		<ol style="list-style-type: none"> 1. To purify and analyse the antigens and antibodies. 2. To apply different Hybridization techniques and ELISA, RIA. 3. To detect various diseases by application of anti sera.

				4. To engineer antibodies and catalytic antibodies and produce drugs to allergies
19	Core1	MicrobialBiochemistry andGenetics	2021	1.Familiar with the tools and techniques for isolation and purification of genes, vector construction. 2.Understand the mechanisms of regulation of gene expression in different operons. 3.Know the techniques for transfer and expression of cloned gene and 4.Apply the knowledge of genetic engineering in biological research
20	Core2	Immunology	2021	1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about Biological data and database search tools. 4.Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis
21	Core3	Practicalrelatedto Microbiology	2021	1. Use diagnostic kits to test different types of auto immune diseases. 2. Prepare Rabbit for performance of immunological studies. 3. Perform Single Radial Immunodiffusion. 4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc. 5. Do Heme agglutination tests for identification of different antigens
22	Core4	Practicalrelatedto Immunology	2021	1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 2. Learn structure, function of gene and its transfer methods 3. Develop understanding on cause, spread and control of diseases caused by different microorganisms 4. Get knowledge on collection of data, thesis writing.

23	Generic Elective(Two papersoutof three)	a)MolecularBiology	2021	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learnabout the mechanism and regulation of transcription in prokaryotes and eukaryotes. 3. Learnabout genetic code and their evolution. 4. Gain knowledge in Different stages and components of protein synthesis
		b)MolecularBiology	2021	<ol style="list-style-type: none"> 1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands. 2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands. 3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones. 4. Acquire knowledge on Hormonal regulation of menstrualcycle anddisordersassociatedwithGonadalhormones
		c)Cell and DevelopmentalBiology	2021	<ol style="list-style-type: none"> 1.Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion, Apoptosis, Senescence, integrins. 2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development. 3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants. 4. Gain knowledge aboutMiscelle, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis
24	OpenElective to others (For other department students)	c) Basics of Immunology Immunotechniques	2021	<ol style="list-style-type: none"> 1. Gain knowledge on essential features of different types of antigens, antibodies. 2. Out line, compare and contrast the key mechanism of innate and adaptive immunity. 3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation. 4. Apply knowledge in disease diagnosis through serological tests.
25	OpenElective(b)	<i>Immunotechniques andtheirApplications</i>	2021	<ol style="list-style-type: none"> 1. To purify and analyse the antigens and antibodies. 2. To apply different Hybridization techniques and ELISA, RIA.

				<p>3. To detect various diseases by application of antiisera.</p> <p>4. To engineer antibodies and catalytic antibodies and produce drugs to allergies.</p>
26	Core1	<i>Genetic Engineering</i>	2021	<p>1.Familiar with the tools and techniques for isolation and purification of genes, vector construction.</p> <p>2.Understand the mechanisms of regulation of gene expression in different operons.</p> <p>3.Know the techniques for transfer and expression of cloned gene and</p> <p>4.Apply the knowledge of genetic engineering in biological research</p>
27	Core2	<i>TechnicalWriting,BiostatisticsandBioinformatics</i>	2021	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Learn to apply hypothesis testing via some of the statistical distributions.</p> <p>3. Develop understanding about Biological data and database search tools.</p> <p>4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis.</p>
28	Core3P	<i>PracticalrelatedtoClinicalImmunology, BiostatisticsandBioinformatics</i>	2021	<p>1.Use diagnostic kits to test different types of auto immune diseases.</p> <p>2. Prepare Rabbit for performance of immunological studies.</p> <p>3. Perform Single Radial Immunodiffusion.</p> <p>4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc.</p> <p>5. Do Heme agglutination tests for identification of different antigens</p>
29	Core4	<i>ProjectWork</i>	2021	<p>1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures</p> <p>2. Learn structure, function of gene and its transfer methods</p> <p>3. Develop understanding on cause, spread and control of diseases caused by different microorganisms</p> <p>4. Get knowledge on collection of data, thesis writing</p>
30	GenericElective (a)	<i>Clinical Immunology</i>	2021	<p>1. Understand different types of immunity and components of the Immune System.</p> <p>2. Gain knowledge on auto immune diseases, Animal models used to study them and the treatment for them.</p> <p>3. Familiar with</p>

				<p>Clinical manifestation of graft rejection, general immunosuppressive therapy and immunotolerance to allografts.</p> <p>4. Acquire the knowledge on oncogenes, Psychoimmunology and neuroimmunomodulation</p>
31	Generic Elective (b)	<i>Applied And Molecular Immunology</i>	2021	<p>1. Develop skill in production of monoclonal antibodies.</p> <p>2. How better enzyme immobilization enhances its activity and their industrial and clinical applications.</p> <p>3. Familiar with different types of vaccines and how they help in prevention of diseases.</p> <p>4. Acquire the knowledge on IPR and procedures for patent filing</p>
32	General Elective (C)	<i>Immunopharmacology</i>	2021	<p>1. Understand about drug receptors, pharmacodynamics, pharmacokinetics, drug biotransformation.</p> <p>2. Acquire knowledge on Immunomodulation therapy, malignancy therapy.</p> <p>3. Gain knowledge on Prostaglandins, thromboxanes, leukotrienes and inhibitors of these molecules formation.</p> <p>4. Familiar with Nitric oxide and its immunological effects.</p>
33	Open Elective a	<i>Research Methodology</i>	2021	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Acquire hands on training on various computational tools and techniques.</p> <p>3. Learn to apply hypothesis testing via some of the statistical distributions.</p> <p>4. To acquire knowledge on research proposals and motivate students towards research</p>
34	Open Elective (b)	<i>Immunological Diseases and Therapeutics</i>	2021	<p>1. Maintain the Clinical Immunology lab with all required standards.</p> <p>2. Outline, compare and contrast the key mechanism of innate and adaptive immunity.</p> <p>3. Gain knowledge on different types of immunodeficiencies, their treatment and about autoimmune disorders.</p> <p>4. Familiar with Clinical manifestation in graft acceptance or rejection and how immunosuppressive therapy is useful. And about cancer immunotherapy.</p>

30. Botany

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	BOT-101	Algae, Bryophytes, Pteridophytes and Gymnosperms	2021	<ol style="list-style-type: none"> 1. The student able to distinguish different species of lower plant groups. 2. Cultivation methods of Algae for industrial production of Single Cell Proteins, Agar Agar ,carragin and Neutraceuticals.Discuss the importance of morphological structure, classification, reproduction and economic importance of Algae.
2	BOT-102	Taxonomy of Angiosperms	2021	<ol style="list-style-type: none"> 1) Plant identification skills 2) Herbaria preparation and documentation.
3	BOT-103	Microbiology	2021	<ol style="list-style-type: none"> 1. Isolation and identification of Pathogenic and Non-Pathogenic micro-organisms. 2. Methods of cultivation of economically/industrially important microorganisms. 3. Plant decease identification and control methods.
4	BOT-104	Plant Development and Reproduction	2021	<ol style="list-style-type: none"> 1. Wood formation and types 2. Reproductive structures. Mode of Reproduction
5	BOT-105P	Practical-I Algae, Bryophytes, Pteridophytes and Gymnosperms & Taxonomy of Angiosperms	2021	<ol style="list-style-type: none"> 1) Identification of different Algal forms 2) Morphological description and use of Floral Keys for plant Oidentification.
6	BOT-106P	Practical-II Microbiology & Plant Development and Reproduction	2021	<ol style="list-style-type: none"> 1. Isolation, culture and staining methods for identification of micro-organisms. 2. Diagnosis of Plant deceases based on symptoms and control methods. 3. Histology of vegetative and reproductive structures and isolation
9	BOT-107	Audit Course Human Values and Professional Ethics-I	2021	<ol style="list-style-type: none"> 1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present

				society.
10	BOT-201	Plant Biochemistry and Metabolism	2021	<ol style="list-style-type: none"> 1) Biosynthesis of plant primary metabolites and chemistry. 2) Plant physiological processes water relation, plant nutrition and energy metabolism, 3) Metabolic changes in response to biotic and abiotic stress
11	BOT-202	Phytobiodiversity and Conservation	2021	<ol style="list-style-type: none"> 1. Knowledge on Phytodiversity, biodiversity centers and types of Biodiversity. 2. Phytodiversity analysis using Remote sensing 3. Causes for the loss of phytodiversity and conservation strategies.
12	BOT-203	Plant Ecology	2021	<ol style="list-style-type: none"> 1) Concepts of Ecology Students, relation between biotic and abiotic factors in an ecosystem. 2) Interaction between biotic communities and ecological energetics 3) Environmental pollution, Global warming and Environmental protection strategies and green energy production
13	BOT-204	Cell Biology, Genetics and Evolution	2021	<ol style="list-style-type: none"> 1. Knowledge on structure and functions of major plant cell organelles, chromatin organization, Cytoskeleton and cell cycle regulation 2. Genetic basis of inheritance of genes and their mapping in eukaryotes and microbes 3. Theories and process of organic evolution and speciation.
14	BOT-205P	Practical-I Plant Biochemistry and Metabolism & Phytobiodiversity and Conservation	2021	<ol style="list-style-type: none"> 1. Plant metabolite analysis and metabolic enzyme activity 2. Methods for Phytodiversity analysis.
15	BOT-206P	Practical-II Plant Ecology & Cell Biology, Genetics and Evolution	2021	<ol style="list-style-type: none"> 1) Plant communities 2) Methods for analysis of environmental pollutants 3) Designs of waste water treatment plants. 4) Assessment of effect of Global warming on Plant systems 5) Study of chromosomal morphology and behavior in Mitosis and Meiosis 6) Practical Problem solving on genetic concepts
	BOT-207	Audit Course-II Human Values and	2021	<ol style="list-style-type: none"> 1. Student will know the values of ethics in various fields including medical, social and business ethics.

		Professional Ethics-II		<ol style="list-style-type: none"> 2. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 3. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
16	BOT-301	MOLECULAR PLANT PHYSIOLOGY	2021	<ol style="list-style-type: none"> 1.Signal transduction pathways and Senescence 2.Molecular mechanism of Photosynthesis 3. Synthesis and application of Nanomaterials. 4. Molecular Physiology of Stress and Flowering
17	BOT-302	MOLECULAR BIOLOGY AND TECHNIQUES	2021	<ol style="list-style-type: none"> 1. Nucleic acids properties and mechanism of DNA replication and damage repair, and Chromatin organization and Cell Cycle regulation 2. Gene expression, processing of Transcripts and Proteins, and mechanisms of regulation of gene expression in Prokaryotes and Eukaryotes. 3. Principles of Microscopy, Nucleic acid and protein separation and identification techniques and methods
19	BOT-303	MUSHROOM CULTIVATION	2021	<ol style="list-style-type: none"> 1) Identification of types of edible and poisonous mushrooms. 2) Method of cultivation of mushrooms and diseases management
20	BOT-304A	PLANT RESOURCE AND HUMAN WELFARE	2021	<ol style="list-style-type: none"> 1. Food Yielding Plants as a source of food, fiber and timber. 2. Plants used in curing human diseases and other ailments in traditional medical systems and Veterinary diseases 3. Spices and condiments, Non timber forest products. 4. Preparation and application of Bio fertilizers, Bio pesticides, Bio insecticides, mushroom cultivation and plant based preservatives
21	BOT-304B	GARDENING AND NURSERY TECHNIQUES	2021	<ol style="list-style-type: none"> 1. Nurseries development and Management, and Garden designing for different plant groups 2. <i>In vivo</i> and <i>in vitro</i> plant propagation methods 3.Plant nutrition and protection 4. Types of gardens and nurseries
22	BOT-304C	ORGANIC FARMING	2021	<ol style="list-style-type: none"> 1. Different types of compost preparation and their Nutritive value. 2. Biofertilizers and organic preparations, their marketing and farm management.

				3. Vermicompost Technology
23	BOT-305P	Practical-I Molecular Plant Physiology & Molecular Biology and Techniques	2021	<ol style="list-style-type: none"> 1. Extraction and Estimation of Chlorophyll pigments. 2. Assay of enzyme activity 3. Estimation of Carbohydrate, proteins and separation 4. Seed viability and germination 5. Metabolite accumulation under stress 6. Study of Chromosomal Behavior during Mitosis. 7. Isolation of DNA, RNA and proteins, Quantitative estimation 8. Assignments on DNA structure, Replication and Gene expression.
24	BOT-306P	Mushroom Cultivation	2021	<ol style="list-style-type: none"> 1. Maintenance of mushroom cultivation labs. 2. Process of Mushroom cultivation: 3. Harvesting of mushrooms.
25	BOT-401	Genomics and Proteomics	2021	<ol style="list-style-type: none"> 1. Molecular marker techniques and construction of genetic and physical maps. 2. Whole genome sequencing strategies, and structural and functional annotation. 3. Principles and methods of Transcriptome and Proteome analysis. 4. Mechanisms of evolution of genomes, New genes and proteins and construction of Phylogenetic trees. 5. Structural organization of plant genomes, Arabidopsis and rice genomes and applications of genome projects.
26	BOT-402	Plant Biotechnology	2021	<ol style="list-style-type: none"> 1. Techniques of Plant Tissue Culture and Applications. 2. Process of r-DNA technology 3. Production of genetically modified crops and Achievements
27	BOT-403	Project work	2021	Identification of problem, review of literature, identification of lacuna, setting of objectives, adoption of standard modern techniques or tools, data collection, analysis of results, and interpretation to provide scientifically valid conclusions. Preparation of thesis. Future scope of research problem
28	BOT-404A	Nanobiotechnology	2021	<ol style="list-style-type: none"> 1. Production of nano scale devices by different methods. 2. Applications of nano devices in medicine and agriculture
29	BOT-404B	Ethnobotany and Plant Drugs	2021	<ol style="list-style-type: none"> 1. Ethnobotanical knowledge 2. Medicinal plant Cultivation, Multiplication, Collection, Processing and Marketing 3. Sources of Plant Medicines, Formulations, Diagnostic features and

				their Biological activity.
30	BOT-404C	Horticulture	2021	<ol style="list-style-type: none"> 1. Propagation methods for horticultural crops 2. Soil science and fertility management for horticultural crops. 3. Seed production technology of horticultural crops.
31	BOT-405P	Practical- Genomics and Proteomics & Plant Biotechnology	2021	<ol style="list-style-type: none"> 1) Isolation of genomic DNA and RNA; Purification and Quantification by Spectrophotometry. 2) Preparation of DNA denaturation curve 3) Restriction digestion of DNA, Agarose Gel Electrophoresis 4) PCR amplification of DNA. and RAPD analysis. 5) Precipitation of proteins ,Estimation of protein. 6) Determination of Isoelectric Point of proteins 7) Separation of proteins by SDS-PAGE and size determination 8) Problems related to genomics, proteomics and molecular evolution 9) Establishment of callus, organ and cell cultures

31. Biotechnology

S.No	PROGRAMME	COURSE CODE	COURSE TITLE	Years of Introduction	Course Outcomes
1	M.Sc. Biotechnology	BTH 101	Structure and Functions of Biomolecules	2021	<ol style="list-style-type: none"> 1. Understand the classification of carbohydrates and their biochemical functions. 2. Correlate the reactions of amino acids that are basis for identification tests and biochemical pathways. 3. Know the structure of different classes of lipids and their roles in biological systems. 4. Comprehend the structure and functions of nucleic acids
2		BTH102	Advanced Tools and Techniques	2021	<ol style="list-style-type: none"> 1. Learn about various techniques for isolation and concentration of macromolecules. They will also understand the principles and applications of different Microscopes 2. Understand the techniques of chromatography, centrifugation and electrophoresis 3. Achieve a basic understanding of characterization of biomolecules by different Spectroscopic techniques 4. They learn safety measures in handling radioisotopes and familiarize with the various radioisotope tracer techniques and their role in biology.
3		BTH103a	Microbiology and diseases	2021	<ol style="list-style-type: none"> 5. Acquire the knowledge on classification and structure of different microorganisms 6. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures

					<ol style="list-style-type: none"> 7. Learn structure, function of gene and its transfer methods 8. Develop understanding on cause, spread and control of diseases caused by different microorganisms
4		BTH103b	Molecular Plant Physiology	2021	<ol style="list-style-type: none"> 1. Explain the detailed characteristics of chloroplast and mechanism of photosynthesis 2. Engineer photorespiration as well as apply other approaches to increase plant biomass 3. Gain the proficient knowledge about structure and functionality chloroplast protein and encoding genes as well as hormonal response on plants 4. Correlate phytohormone signalling in plant defense mechanism
5		BTH104a	Cell biology and Genetics	2021	<ol style="list-style-type: none"> 1. Differentiate prokaryotic and eukaryotic cell 2. Understand the organization of genetic material in lower and higher organisms 3. Appreciate the mechanism of mitotic and meiotic process and identify the abnormalities 4. Understand the molecular mechanisms of mutations and its importance in evolution
6		BTH104b	Molecular Genetics	2021	<ol style="list-style-type: none"> 1. Recapitulate Mendelian Principles 2. Understand the mechanisms of sex determination 3. Gain knowledge about types of genes 4. Understand the viral genetics
7		BTH105P	Bio-molecules and Advanced Tools and	2021	<ol style="list-style-type: none"> 1. Acquire the skill to perform

			Techniques		experiments related to Biochemical preparations and advanced tools and techniques
8		BTH106P	Microbiology and Cell Biology	2021	1. Obtain the skill to perform experiments related to Microbiology and Cell Biology
9		BTH107 Auditcourse	Human values and Professional ethics-I	2021	1. Learn the importance of Human values and Professional ethics
10					
11		BTH 201	Enzymes and Intermediary Metabolism	2021	1. Gain knowledge on different enzymes and their significance 2. Correlate how the living organisms exchange energy and matter with the surroundings for their survival, and store free energy in the form of energy-rich compounds 3. Recognize how the catabolic breakdown of the substances is associated with release of free energy; whereas, free energy is utilized during synthesis of biomolecules i.e., anabolic pathways 4. Apply the knowledge of metabolic pathways to biotechnological and biochemical research.
12		BTH 202	Molecular Biology	2021	1. Understand the biochemical composition and genome organization in living cells 2. Learn about the mechanism of tissue specific transcription and role of RNA polymerases 3. Appreciate the correlation of genetic code with protein synthesis in prokaryotic and eukaryotic cells. 4. Gain insights of mechanism of gene expression and regulations
13		BTH 203a	Immunology	2021	1. Out line, compare and contrast the key

					<p>mechanism of innate and adaptive immunity</p> <ol style="list-style-type: none"> 2. Apply knowledge in disease diagnosis through serological tests 3. Develop skill in production of monoclonal antibodies 4. Gain knowledge on undesirable immunological reactions and their complications in health management
14		BTH 203b	Cancer Biology	2021	<ol style="list-style-type: none"> 1. To understand cancers, the mechanisms involved from theory concept, experimental, research and human health-care perspectives 2. To acquire the required experimental skills in cancer biology from research and human healthcare perspectives 2. To develop understanding about principles of carcinogenesis 3. Acquire knowledge on signal targets towards therapy of cancer and Gene therapy
15		BTH 204a	Research Methodology, Biostatistics and Bioinformatics	2021	<ol style="list-style-type: none"> 4. Discuss the various steps involved in conducting research 5. Learn to apply hypothesis testing via some of the statistical distributions 5. Develop understanding about Biological data and database search tools 7. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis
16		BTH 204b	Proteomics	2021	<ol style="list-style-type: none"> 1. Handle a proteins and its characterization. 2. Know the principles of proteome

					<p>quantification.</p> <ol style="list-style-type: none"> 3. Demonstrate how various types of mass spectrometers (e.g. Orbitrap, triple-quad, Q-TOF) can be used for proteome quantification, structure determination of proteins by various methods. 4. Use software tools to analyse various quantitative proteomic data types, Principles of statistical analysis of proteomic data, how quantitative proteomics can be applied in biology, clinical research and drug discovery and designing novel proteins.
17		BTH 205P	Enzymology, metabolism and Molecular Biology	2021	Learn the skill to perform experiments related to Enzymology and Molecular Biology
18		BTH 206P	Immunology, Biostatistics and Bioinformatics	2021	Learn the skill to perform experiments related to Immunology and analyze data using various biostatistical methods.
19		BTH 207 Auditcourse	Human values and Professional ethics-II	2021	Learn the importance of Human values and Professional ethics
20		BTH 301	Genetic Engineering	2021	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes 2. Acquire knowledge on vectors for construction of genomic libraries and cDNA libraries 3. Understand the mechanism of cDNA synthesis 4. Know the techniques for transfer and expression of cloned gene and applications of genetic engineering in biological research.

21		BTH 302	Food and Industrial Biotechnology	2021	<ol style="list-style-type: none"> 1. Acquire knowledge on food preservation, processing and control measures for food poisoning 2. Establish indoor and outdoor cultivation units for algal cultivation 3. Learn effective management of solid waste for energy production. 4. Appreciate the industrial role of microorganisms in production of biomolecules
22		BTH 303 a.	Bioprocess Engineering and Technology	2021	<ol style="list-style-type: none"> 1. Handle the axenic cultures of industrially important microbes and appreciate the relevance of microorganisms from industrial context. 2. Gain an overview on design, operations and types of fermentation systems 3. Calculate yield and production rates in a biological production process, and also interpret data 4. Apply knowledge on separation and purification of end products of fermentation
		BTH 303b.	Legal, Ethical and Implications of Biotechnology	2021	<ol style="list-style-type: none"> 1. Develop awareness on types IPR and patenting process 2. Understand legal and ethical controversies in biotechnological innovations 3. Apply knowledge in providing safety of food, water and environment 4. Gain overview of GM crops and microbes and their impact on environment

		BTH 303c.	Emerging technologies in Biotechnology	2021	<ol style="list-style-type: none"> 1. Acquire the knowledge about recent trends in stem cell technology and medical applications of stem cells 2. Understand the Biosynthesis of nanomaterials and biomedical applications of nanomaterials. 3. Learn role of antibodies in biosensing and applications of Nano biosensors in medicine, food industry and environmental monitoring. 4. Develop understanding on RNAi Technology and its technological applications
23		BTH 304 P	Genetic Engineering, Food and Industrial Biotechnology	2021	<ol style="list-style-type: none"> 1. Learn the skill to perform the techniques for transfer and expression of cloned gene and applications of genetic engineering in biological research
24		BTH 305	Plant Tissue Culture	2021	<ol style="list-style-type: none"> 1. Learn important milestones in the plant tissue culture and understand the concepts and principles of Plant tissue culture. 2. Learn different pathways of plant regeneration under in vitro conditions – organogenesis, somatic embryogenesis, synthetic seeds and applications. 3. Understand techniques of establishing cell suspension culture, techniques of virus elimination by meristem and shoot tip culture. 4. Acquire skill of propagation of elite medicinal and economically important plants and establish micropropagation unit for commercialization.
25		BTH 306a	Bioethics	2021	<ol style="list-style-type: none"> 1. Acquire the knowledge on IPR and procedures for patent filing

					<ol style="list-style-type: none"> 2. Understand the Legal and Ethical aspects of gene therapy - cloning - Manipulation of human genome - Technology transfer. 3. Learn role of Government, Industries and society in promoting, accepting and regulating the rDNA research 4. Develop understanding on Environmental and Health aspects of Biotechnology
26		BTH 306b	Bioinformatics	2021	<ol style="list-style-type: none"> 1. Develop understanding about Biological data and database search tools 2. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis 3. Learn about pathway and enzyme databases, Sequence submission tools 4. Develop understanding on protein folding and its significance
27					
28		BTH 401	Environmental Biotechnology	2021	<ol style="list-style-type: none"> 1. Learn the relation between biotic and abiotic factors in different ecosystem models and predict how changes in free energy availability affect ecosystems. 2. Appreciate the role of microorganisms in biodegradation and pollution detection 3. Develop skill on large scale production and applications of bio pesticides and bio fertilizers fin agriculture 4. Apply knowledge on solid waste management and reclamation of waste water

29		BTH 402	Plant Biotechnology	2021	<ol style="list-style-type: none"> 1. Develop skill in production of transgenic plants resistant to biotic and abiotic stress 2. Apply knowledge for industrial production of plant metabolites 3. Cultivate the micro and macro algae of commercial importance on large scale 4. Identify different plant pathogens and apply biological control methods
30		BTH 403a	Animal Biotechnology	2021	<ol style="list-style-type: none"> 1. Understand the organization of reproductive organs and advances in contraception research 2. Learn the techniques of In Vitro Fertilization and artificial insemination 3. Develop skill in molecular techniques for production of transgenic animals 4. Apply knowledge on molecular farming for production of vaccines and hormones
31		BTH 403b	Applications of Biotechnology	2021	<ol style="list-style-type: none"> 1. Acquire the knowledge on applications of plant, animal and environmental biotechnology 2. Develop skill on organic farming and preparation of bio pesticides and bio fertilizers 3. Establish and maintain cell lines for vaccine production 4. Apply knowledge on waste management and recycling for environmental protection
32		BTH 403c	Pharmaceutical Biotechnology	2021	<ol style="list-style-type: none"> 1. Gain knowledge on preparation and formulations of different drugs 2. Develop skill on commercial production of pharmaceutical products for human welfare

					<ol style="list-style-type: none"> 3. Learn the techniques of drug validation and vaccine production 4. Understand the bioethical principle, values, concepts and social and judicial implications of pharmaceutical biotechnology
33		BTH 404P	Environmental Biotechnology, Plant Biotechnology	2021	1. Learn the techniques related to Environmental and Plant biotechnology
34		BTH 405	MOOCS/Project	2021	1. Select the appropriate research design and develop appropriate research hypothesis for a research project and acquire hands on training on various tools and techniques employed in executing the project.
35		BTH 406a	Applications of Biotechnology	2021	<ol style="list-style-type: none"> 1. Acquire the knowledge on applications of plant, animal and environmental biotechnology 2. Develop skill on organic farming and preparation of bio pesticides and bio fertilizers 3. Able to establish and maintain cell lines for vaccine production 4. Apply knowledge on waste management and recycling for environmental protection
36		BTH 406b	Tools in Biotechnology	2021	<ol style="list-style-type: none"> 1. Acquire the knowledge on analysis of DNA replication to map site specific points of replication 2. Learn to apply DNA microarrays to detect replication origins 3. Understand the functions of helicase and polymerase in DNA replication 4. Acquire knowledge on sophisticated programmed of genome replication

32. Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CHE - 101	Inorganic Chemistry I	2021	<p>Understanding the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes.</p> <p>The polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules.</p> <p>Learning the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions.</p> <p>Gaining knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.</p>
2	CHE - 102	Organic Chemistry I	2021	<p>Gaining knowledge on stereochemical structures of the molecules, stereoselective and stereocontrolled reactions.</p> <p>Ascertaining the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents.</p> <p>Understanding the concept of isotope effects, potential energy diagrams and transition states in different intermediates.</p> <p>Familiarized with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids.</p>
3	CHE - 103	Physical Chemistry I	2021	<p>Understanding the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics.</p> <p>Learning theories of reaction rates, Lindemann, Lindemann-</p>

				<p>Hinshel wood, and RRKM theories.</p> <p>Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties.</p> <p>Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification</p>
4	CHE -104 (A)	General Chemistry I	2021	<p>Gaining Knowledge on mean and median values, standard deviation and coefficient of variation</p> <p>Acquainting knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS.</p> <p>Understanding principle and concept of ecosystem and their functioning</p> <p>Getting an idea on environmental pollution and environmental impact assessment.</p>
5	CHE -104 (B)	General Chemistry I	2021	<p>Familiarizing on green reaction conditions and their impact on environment.</p> <p>Gaining knowledge on use of different biocatalysts as environmentally friendly reagents.</p> <p>Acquainting on the use of modern techniques like ultrasound, microwave etc.</p> <p>Getting an idea on the use of ionic liquids in different reactions.</p>

6	CHE 105 A & B	Core practical I: Inorganic & Physical Chemistry	2021	<p>Knowing the mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations</p> <p>Familiarizing with techniques of titration and calculation of errors.</p> <p>Understanding the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different systems.</p> <p>Calibrating the statistical data</p>
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7	CHE 106A & B	Core practical I: Organic & General Chemistry	2021	familiarizing the systematic procedures of analysis of organic components. Getting knowledge on the conformational tests for various functional groups. Understanding the mechanisms and familiarize with methodologies to prepare biologically important molecules. Purification of compounds by different process
8	CHE 107	Human Values and Professional Ethics-I	2021	Learning about the needs and importance of professional ethics. Analyzing nature of Values, basic Moral Concepts character and Conduct. Gaining knowledge on individual and society ethical values, ahimsa, satya and brahmacharya. Understanding values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics.
9	CHE - 201	Inorganic Chemistry II	2021	Familiarizing with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes. Learning about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams. Understanding about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods. Gaining knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions.
10	CHE-202	Organic Chemistry II	2021	Familiarizing the mechanisms of E_1 , E_2 and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments. Learning the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of

				<p>reactions.</p> <p>Knowing synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions.</p> <p>Understanding the structural elucidation and synthesis of alkaloids using specific reagents.</p>
11	CHE -203	Physical chemistry II	2021	<p>Learning about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems.</p> <p>Knowing Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants.</p> <p>Identifying Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem.</p> <p>Acquiring knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system.</p>
12	CHE-204 A	General Chemistry II	2021	<p>Acquiring knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and principles of amperometric titrations.</p> <p>Learning general principles and classifications of chromatographic separations and applications of TLC, GLC and HPLC.</p> <p>Knowing about biodiversity, ecosystem diversity and conservation of biodiversity.</p> <p>Acquiring knowledge on natural resources related to food, water, mineral, energy and land.</p>
13	CHE 204B	Chemistry in Contemporary Society	2021	<p>Familiarizing knowledge in pharmaceutical chemicals</p> <p>Gaining knowledge with blood fluids, blood, enzymes and forensic</p> <p>Knowing about fermentation, detection of purity, beverages</p>

				Acquiring knowledge on gaseous fuels, soil ingredients and analysis of trace elements
14	CHE 205 A & B	Core practical I: Inorganic & Physical Chemistry	2021	Developing skills to separate and determine the two component mixtures Acquiring knowledge in the preparation of metal complexes Studying the determination of cell constant and verification of Onsagar equation, strength of strong acid by Titration of a strong acid with a strong base and vice versa Getting knowledge on the applications of conductometry, potentiometry, coulometry and pHmetry.
15	CHE 206A & B	Core practical I: Organic & General Chemistry	2021	Familiarizing with binary mixture separation Gaining hands-on-experience in purification of the components, preparation of derivatives. Getting knowledge about the chemical behavior of different components and mechanisms Purification and calibration of data
16	CHE 207	Human Values and professional ethics-II	2021	Understanding the concepts of human values, responsibilities of family values and status of women in family and society. Acquiring knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners. Gaining knowledge on social ethics and understand the characteristics of ethical problems in management. Familiarizing environmental ethics, ethical theory and ecological crisis.
17	CHE-AC- 301	Inorganic Spectroscopy and Thermal Methods of Analysis	2021	Understanding about TG and DTA and applications of different scanning calorimetry. Gaining knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy. Learning zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR. Knowing about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy.

18	CHE-AC 302	Organic Spectroscopy and Applications	2021	<p>Getting experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds. Familiarizing with the absorption bands of the molecules with specific functional groups</p> <p>Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided</p> <p>Acquiring knowledge about specific fragmentation rules of different molecules which are unique.</p>
19	CHE-AC-303A	Organic Chemistry III	2021	<p>Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules.</p> <p>Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>Understanding diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions</p> <p>Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.</p>
20	CHE-AC-303B	Physical Chemistry III	2021	<p>Understanding the determination of Character Coordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle.</p> <p>Learning the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals.</p> <p>Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>

21	CHE AC 304	Core practical I: Analytical Chemistry- Practical	2021	Familiarizing the basic principles of instrumental methods of analysis. Gaining knowledge on chemistry of alloys. Understanding the complexity, theory and working principle of colourimetry Familiarizing with laws of colorimetric titrations.
22	CHE AC 305A	Chemotherapy and Drug Analysis	2021	Knowing about the classification and synthesis of drugs. Familiarizing with the qualitative and quantitative analysis of drugs.
23	CHE AC 305B	Instrumental Methods of Analysis	2021	Understanding the complexity, theory and working principle of colourimetry. Gaining knowledge on analysis of organic components
24	CHE AC 306	Spectral Techniques	2021	Knowing the basic principles of spectroscopy. Familiarizing with the analysis of various functional groups by using different spectroscopic techniques. Understanding the applications of AAS. Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.
25	CHE AC 306	Chromatographic Techniques	2021	Understanding the stationary and mobile phases in chromatographic techniques. Familiarizing applications of different chromatographic methods. Understanding the principle of chromatographic techniques. Gaining knowledge on the normal phase and reverse phase.
26	CHE-EC- 301	Inorganic Spectroscopy and Thermal Methods of Analysis	2021	Knowing about TG and DTA and applications of different scanning calorimetry. Gaining knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy. Learning zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR. Knowing about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy.
27	CHE-EC 302	Organic Spectroscopy and Applications	2021	Getting experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds.

				<p>Familiarizing with the absorption bands of the molecules with specific functional groups</p> <p>Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided</p> <p>Acquiring knowledge about specific fragmentation rules of different molecules which are unique.</p>
28	CHE-EC-303A	Organic Chemistry III	2021	<p>Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules.</p> <p>Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>Understanding diastereoselectivity, stereoselectivity and substrate controlled auxiliary controlled reactions</p> <p>Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.</p>
29	CHE-EC-303B	Physical Chemistry III	2021	<p>Knowing the determination of Character Co-ordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle.</p> <p>Learning the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals.</p> <p>Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>

30	CHE EC 304	Core practical I: Environmental Chemistry - Practical	2021	Understanding the basic idea on techniques of water analysis and acidity alkalinity Getting experience with the calculations of BOD and COD Understanding the basics of soil analysis viz. pH, Conductivity Acquiring an experience on the determination of heavy metals in soil
31	CHE EC 305A	Chemotherapy and Drug Analysis	2021	Knowing about the classification and synthesis of drugs. Familiarizing with the qualitative and quantitative analysis of drugs.
32	CHE EC 305B	Instrumental Methods of Analysis	2021	Knowing about the potentiometric analysis of mixtures of acids and halides Familiarizing with the Flame photometric analysis of Na, K, and Li
33	CHE EC 306	Spectral Techniques	2021	Knowing the basic principles of spectroscopy. Familiarizing with the analysis of various functional groups by using different spectroscopic techniques. Understanding the applications of AAS. Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.
34	CHE EC 306	Chromatographic Techniques	2021	Knowing the stationary and mobile phases in chromatographic techniques. Familiarizing applications of different chromatographic methods. Understanding the principle of chromatographic techniques. Gaining knowledge on the normal phase and reverse phase.
35	CHE-IC- 301	Inorganic Spectroscopy and Thermal Methods of Analysis	2021	Knowing about TG and DTA and applications of different scanning calorimetry. Gaining knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy. Learning zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR. Knowing about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy.
36	CHE-IC 302	Organic Spectroscopy and	2021	Getting experience to calculate λ max values for dienes,

		Applications		<p>enones, polyenes, aromatic and heteroaromatic compounds. Familiarizing with the absorption bands of the molecules with specific functional groups</p> <p>Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided</p> <p>Acquiring knowledge about specific fragmentation rules of different molecules which are unique.</p>
37	CHE-IC-303A	Organic Chemistry III	2021	<p>Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules.</p> <p>Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>Understanding diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions</p> <p>Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.</p>
38	CHE-IC-303B	Physical Chemistry III	2021	<p>Familiarizing the determination of Character Co-ordinate of C_{2V} point group based on 3N Coordinates and to learn the Mutual exclusion Principle.</p> <p>Learning the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals.</p> <p>Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
39	CHE IC 304	Core practical I: Inorganic Chemistry - Practical	2021	<p>Knowing the synthesis of inorganic complexes Tris thiourea Zinc (II) Sulphate, Tris thiourea Copper(I) Sulphate, Hexamine nickel (II) Chloride,</p>

				<p>Chloropentamine cobalt (III) Chloride Gaining knowledge on characterization techniques Getting experience on the preparation of Mercury tetrakis thiocyanato cobaltate (II) Sodium trioxalato ferrate (III) Familiarizing with the characterization of complexes.</p>
40	CHE IC 305A	Chemotherapy and Drug Analysis	2021	<p>Learning about the classification and synthesis of drugs. Familiarizing with the qualitative and quantitative analysis of drugs.</p>
41	CHE IC 305B	Instrumental Methods of Analysis	2021	<p>Understanding the complexity, theory and working principle of colourimetry. Gaining knowledge on analysis of organic components.</p>
42	CHE IC 306	Spectral Techniques	2021	<p>Knowing the basic principles of spectroscopy. Familiarizing with the analysis of various functional groups by using different spectroscopic techniques. Understanding the applications of AAS. Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.</p>
43	CHE IC 306	Chromatographic Techniques	2021	<p>Knowing the stationary and mobile phases in chromatographic techniques. Familiarizing applications of different chromatographic methods. Understanding the principle of chromatographic techniques. Gaining knowledge on the normal phase and reverse phase.</p>
44	CHE-IC-303A	Organic Chemistry III	2021	<p>Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules. Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents Understanding diastereoselectivity, stereoselectivity and substrate controlled auxiliary controlled reactions Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize</p>

				various compounds.
45	CHE OC 306	Spectral Techniques	2021	Getting experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds. Familiarizing with the absorption bands of the molecules with specific functional groups Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the Acquiring knowledge about specific fragmentation rules of different molecules which are unique.
46	CHE-OC-303A	Inorganic Spectroscopy and Thermal Methods of Analysis	2021	Knowing the basic principles of instrumental methods of analysis. Gaining knowledge on chemistry of alloys. Understanding the complexity, theory and working principle of colourimetry Familiarizing with laws of colorimetric titrations.
47	CHE-OC-303B	Physical Chemistry III	2021	Knowing the determination of Character Co-ordinate of C_{2V} point group based on 3N Coordinates and to learn the Mutual exclusion Principle. Learning the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals. Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy. Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
48	CHE OC 304	Core practical I: Organic Estimations - Practical	2021	Gaining knowledge about the estimation/percent purity of different organic molecules. Getting hands-on-experience with the synthesis and determination of concentrations and purity. Acquiring knowledge in handling of toxic chemicals in estimation process. Gaining experience in the calculating the percentage purity.
49	CHE OC 305A	Chemotherapy and Drug Analysis	2021	Knowing about the classification and synthesis of drugs. Familiarizing with the qualitative and quantitative analysis

				of drugs.
50	CHE OC 305B	Instrumental Methods of Analysis	2021	Acquiring knowledge in handling of toxic chemicals in multistep preparation of biologically important molecules in good percentage of yield. Gaining experience in the proposal of synthetic routes to functionalized derivatives.
51	CHE OC 306	Spectral Techniques	2021	Studying the basic principles of spectroscopy. Familiarizing with the analysis of various functional groups by using different spectroscopic techniques. Understanding the applications of AAS. Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.

52	CHE OC 306	Chromatographic Techniques	2021	Knowing the stationary and mobile phases in chromatographic techniques. Familiarizing applications of different chromatographic methods. Understanding the principle of chromatographic techniques. Gaining knowledge on the normal phase and reverse phase.
53	CHE-PC-301	Physical Chemistry III	2021	Knowing the determination of Character Co-ordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle. Learning the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals. Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy. Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
54	CHE-PC 302	Organic Spectroscopy and Applications	2021	Getting experience to calculate λ_{max} values for dienes, enones, polyenes, aromatic and heteroaromatic compounds. Familiarizing with the absorption bands of the molecules

				<p>with specific functional groups</p> <p>Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided</p> <p>Acquiring knowledge about specific fragmentation rules of different molecules which are unique.</p>
55	CHE-PC-303A	Organic Chemistry III	2021	<p>Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules.</p> <p>Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>Understanding diastereoselectivity, stereoselectivity and substrate controlled auxiliary controlled reactions</p> <p>Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.</p>
56	CHE-PC- 304	Inorganic Spectroscopy and Thermal Methods of Analysis	2021	<p>Knowing1 about TG and DTA and applications of different scanning calorimetry.</p> <p>Gaining knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy.</p> <p>Learning zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR.</p> <p>Knowing about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron.</p>
57	CHE PC 304	Core practical I: Inorganic spectroscopy and thermal methods of analysis	2021	<p>Studying chemical kinetics of homogeneous solutions</p> <p>Gaining knowledge on the determination of different cations by flame photometry</p> <p>Understanding the principle and working aspects of conductometric titrations</p> <p>Acquirinng knowledge on the implementation of colorometric estimations.</p>

58	CHE PC 305A	Chemotherapy and Drug Analysis	2021	Knowing about the classification and synthesis of drugs. Familiarizing with the qualitative and quantitative analysis of drugs.
59	CHE PC 305B	Instrumental Methods of Analysis	2021	Understanding the principle and working aspects of conductometric titrations Acquiring knowledge on the implementation of colorometric estimations.
60	CHE PC 306	Spectral Techniques	2021	Knowing the basic principles of spectroscopy. Familiarizing with the analysis of various functional groups by using different spectroscopic techniques. Understanding the applications of AAS. Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.
61	CHE PC 306	Chromatographic Techniques	2021	Knowing the stationary and mobile phases in chromatographic techniques. Familiarizing applications of different chromatographic methods. Understanding the principle of chromatographic techniques. Gaining knowledge on the normal phase and reverse phase.
62	CHE-AC- 401	Quality Control and General Principles	2021	Able to diagnose problems in the quality improvement process and Explain each total quality implementation phase Knowing about theoretical basis for the use of organic reagents in inorganic analysis. Understanding different types of kinetic methods and their evaluation and to determine the kinetics of enzyme Understanding the oxidation reactions with Ce (IV) sulphate solutions and applications of complexometric titrations
63	CHE-AC 402	Instrumental Methods of Analysis	2021	Understanding the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF). Understanding the basic principles, procedure and components of the High-Performance Liquid

				<p>Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC).</p> <p>Getting knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis.</p> <p>Improving the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I^- and S^{2-}) by using I_2 liberations and Ce^{4+} liberation in solutions</p>
64	CHE-AC-403A	Applied and Environmental Aspects	2021	<p>Getting an idea about preparation of sampling, decomposition, separation and preconcentration of metal ions etc.</p> <p>Gaining experience on agrochemicals and fertilizers and their analysis.</p> <p>Having an idea on the analysis of fuels, alloys and explosives</p> <p>Experiencing with environmental pollution monitoring techniques.</p>
65	CHE-AC-403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2021	<p>Gaining knowledge on metallo proteins in electron transfer processes.</p> <p>Knowing the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>Achieving and developing highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.</p>
66	CHE AC 404	Core practical I: Analytical Chemistry- Practical	2021	<p>Understanding the common laboratory techniques including separation techniques</p> <p>Polarography, atomic absorption spectroscopy in both emission and absorption mode.</p> <p>Gaining knowledge on implementation of gas chromatography and HPLC for separation of mixtures.</p> <p>Familiarizing with interpretation of data to structures by NMR.</p>

67	CHE AC 405A	Project Work	2021	<p>Performing experiments, collection and evaluation of data.</p> <p>Interpretation of results while adhering to scientific principles of responsible and ethical behaviour.</p> <p>Analysing and compiling the data and results in a chronological order in the form of dissertation.</p> <p>Preparation of dissertation.</p>
68	CHE AC 406A	Drug Chemistry	2021	<p>Knowing about natural products.</p> <p>Knowing Interpretation of cardiovascular drugs.</p> <p>Knowing the Analyzing about prostaglandins.</p> <p>Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.</p>
69	CHE AC 406	Electro analytical Techniques	2021	<p>Knowing how to interpret potentiometry and conductometry</p> <p>Knowing the Interpretation of results while adhering to DC Polarography.</p> <p>Knowing the Analysing and compiling the data and results in polarography .</p> <p>Familiarizing Types of ion sensitive electrodes.</p>
70	CHE-IC- 401	Co-ordination Compounds, Organometallic Chemistry & Chemistry of Non-transition Elements	2021	<p>Gaining an extensive knowledge about dinitrogen complexes of Ru(II), Os(II),Co(I), Mo(0)and dioxygen complexes of Ir(I) and Rh(I) and on cycloheptatriene and tropylium complexes of oxidative, reductive elimination reactions</p> <p>Understanding mechanism, stereochemical aspects and regeneration of catalyst in olefin hydrogenation (Wilkinson's catalyst), olefin oxygenation (Wacker process or Smidt reaction), Olefin hydroformylation and Fischer – Tropsch process.</p> <p>Studying the examples of metal complexes having metal-metal single or multiple bonds and analyse the spectroscopic evidences for the presence of metal-metal bond.</p> <p>Understanding the synthesis and structures of boranes, carboranes, borazines, silicates carbides, peroxo compounds and inter halogens, pseudo halides.</p>
71	CHE-IC 402	Instrumental Methods of Analysis	2021	<p>Understanding the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF).</p>

				<p>Understanding the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC).</p> <p>Getting knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis.</p> <p>Improving the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I⁻ and S²⁻) by using I² liberations and Ce⁴⁺ liberation in solutions.</p>
72	CHE-IC-403A	Instrumental Methods of Analysis	2021	<p>Understanding the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF).</p> <p>Understanding the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC).</p> <p>Getting knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis.</p> <p>Improving the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I⁻ and S²⁻) by using I² liberations and Ce⁴⁺ liberation in solutions.</p>
73	CHE-IC-403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2021	<p>Gaining knowledge on metallo proteins in electron transfer processes.</p> <p>Knowing the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>Achieving and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.</p>
74	CHE IC 403	Core practical I:	2021	Understanding the common laboratory techniques

		Inorganic Chemistry - Practical		including separation techniques. Polarography, atomic absorption spectroscopy in both emission and absorption mode. Gaining knowledge on implementation of gas chromatography and HPLC for separation of mixtures. Familiarizing with interpretation of data to structures by NMR.
75	CHE IC 404	Project Work	2021	Having ability to perform experiments, collection and evaluation of data Interpretation of results while adhering to scientific principles of responsible and ethical behaviour. Analysing and compiling the data and results in a chronological order in the form of dissertation. Preparation of dissertation.
76	CHE IC 406A	Drug Chemistry	2021	Knowing about natural products. Knowing Interpretation of cardiovascular drugs. Knowing the Analyzing about prostaglandins. Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.
77	CHE IC 406 B	Electro analytical Techniques	2021	Gaining ability to interpret potentiometry and conductometry Interpretation of results while adhering to DC Polarography. Analysing and compiling the data and results in polarography. Familiarizing Types of ion sensitive electrodes.
78	CHE-OC- 401	Organic synthesis I	2021	Familiarizing with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents Learning about photolytic reactions of carbonyl compounds, conjugated carbonyl derivatives, olefins, conjugated dienes. Gaining knowledge in the determination of allowed or forbidden of chemical reactions <i>viz.</i> , cycloaddition and Learning the methods of preparation, properties, and industrial applications of various addition and condensation Familiarizing with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents
79	CHE-OC 402	Organic Synthesis II	2021	Familiarizing with functionalization and interconversion of functional groups and the concept of organic synthesis by retrosynthetic approach.

				<p>Gaining knowledge in the formulation of synthetic routes for naturally occurring drugs.</p> <p>Understanding quinoline, acridine and guanidine group of alkaloids as antimalarials and to familiarize with the role of functioning of broad spectrum antibiotics.</p> <p>Acquiring knowledge about the classification, properties, structure & conformation and biological functions of peptides/proteins.</p>
80	CHE-OC-403A	Heterocycles and Natural Products	2021	<p>Familiarizing with the synthetic routes of five membered heterocycles with two heteroatoms and to justify the site of Acquiring knowledge on the synthetic methodologies of benzofused and six membered heterocycles and the effect of Familiarizing with the structural elucidation and synthesis of naturally occurring steroids and hormones</p> <p>Knowing about isolation, structural determination and synthesis of flavonoids and isoflavonoids.</p>
81	CHE-OC-403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2021	<p>Gaining knowledge on metallo proteins in electron transfer processes.</p> <p>Knowing the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>Achieving and developing highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.</p>
82	CHE OC 404	Core practical I: Spectral Identification of Organic Compounds	2021	<p>Calculating λ max values.</p> <p>Ascertaining functional groups.</p> <p>Interpreting the spectral data to the structure and stereochemistry of the molecules.</p> <p>Analysing the fragmentation pattern of the molecules.</p>
83	CHE OC 405	Practical II: Project Work	2021	<p>Identifying the problem, to collect the literature and understanding parameters to design the problem.</p> <p>Performing experiments to synthesize the molecules with desired stereochemistry adopting modern techniques.</p> <p>Collection and interpretation of the data to the structures.</p> <p>Presentation of the data in the form of dissertation.</p>
84	CHE OC 406A	Drug Chemistry	2021	<p>Knowing about natural products.</p> <p>Knowing Interpretation of cardiovascular drugs.</p>

				Knowing the analyzing about prostaglandins. Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.
85	CHE OC 406	Electroanalytical Techniques	2021	Getting ability to interpret potentiometry and conductometry Interpretation of results while adhering to DC Polarography. Analysing and compiling the data and results in polarography. Familiarizing Types of ion sensitive electrodes.
86	CHE-PC- 401	Electrochemistry	2021	Knowing the techniques of deposition of metals, throwing power simultaneous discharge of cations and methods of corrosion protection Learning about electrochemical Batteries, fuel cells and nickel-cadmium batteries. Understanding electrical double layer systems, sedimentation potential, null points of metals and zeta potential. Calculating electrochemical parameters; familiarize mixed ligand systems and reversible systems.
87	CHE-PC 402	Thermodynamics, Polymers and Solid-state Chemistry	2021	Deriving Gibbs Duhem equation and to calculate fugacity and chemical potential. Calculating excess free energy and entropy, to draw Hildebrand curves and to correlate excess functions and activity coefficients Learning morphology, T _m and T _g points and to calculate transition temperatures and to identify cross linking in polymers. Identifying magnetic properties of solids, magnetic materials, superconductors and BCS theory
88	CHE-PC-403A	Chemical Kinetics	2021	Drawing skrabal pH diagram and to separate unimolecular and bimolecular reactions Studying laws of photochemistry, to derive stern-volmer equation Identifying chromo potentiometry points and to investigate kinetic currents and isotopic effects Learning photochemical thresholds, chemiluminescence
89	CHE-PC-403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2021	Gaining knowledge on metallo proteins in electron transfer processes.

				<p>Knowing the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>Achieving and developing highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.</p>
90	CHE PC 404	Core practical I: Inorganic Chemistry - Practical	2021	<p>Getting ability to perform titration of mixture of halides and to draw potentiometry curves</p> <p>Learning amperometric titrations and mixtures by polarography</p> <p>Correlation of data obtained from IR, AAS, HPLC and GC</p> <p>Determination of alkalinity and purity by pH metry</p>
91	CHE PC 404	Project Work	2021	<p>Identifying research problems and to collect research literature</p> <p>Proposing hypothesis of a research problem</p> <p>Performing research experiments</p> <p>Analysing the data and conclude the research outcomes</p>
92	CHE PC 406A	Drug Chemistry	2021	<p>Knowing about natural products.</p> <p>Knowing Interpretation of cardiovascular drugs.</p> <p>Knowing the Analyzing about prostaglandins.</p> <p>Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.</p>
93	CHE PC 406	Electroanalytical Techniques	2021	<p>Getting ability to interpret potentiometry and conductometry</p> <p>Interpretation of results while adhering to DC Polarography.</p> <p>Analysing and compiling the data and results in polarography.</p> <p>Familiarizing Types of ion sensitive electrodes.</p>
94	CHE-EC- 401	Energy, Environment and Soil	2021	<p>Knowing about nuclear fission and fusion, uses of solar energy in space heating and water heating, hydropower and water heating, hydropower and production of ethanol from indirect solar energy.</p> <p>Learning physical and chemical properties of water and water complexation in natural and waste water and to understand about global warming, ozone depletion, green house effect and acid rains.</p> <p>Acquiring knowledge on composition of inorganic and</p>

				organic contaminants in soil, soil corrosion and industrial applications of green chemistry. Getting knowledge on various methods of solid waste collection and its disposal.
95	CHE-EC 402	Water Pollution Monitoring and Environment Laws	2021	Acquiring knowledge on disease causing agents in water. Learning about the removal of suspended and dissolved solids present in waste water. Understanding different uses of micro-organisms in environmental protection. Knowing different world life acts such as forest conversion act, water control pollution act and air prevention and control act.
96	CHE-EC-403A	Air Pollution, Control Methods- Noise and Thermal Pollution	2021	Acquiring knowledge on air pollutants, air pollution sampling measurements and analysis caused due to sulphur dioxide, carbon monoxide, nitrogen dioxide, oxidants, ozone, hydro carbons and particulate matter. Learning about different control methods and adsorption of solids and liquids, gas analysis eluents viz., nitrogen oxides, carbon monoxide and hydrocarbons. Understanding pollution caused by vehicle emission, different industries, cement plants, steel mills and petroleum refineries. Knowing about noise and thermal power project pollutions and their effect on human health.
97	CHE-EC-403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2021	Gaining knowledge on metallo proteins in electron transfer processes. Knowing the applications of trace metal ions and metal ions as chelating agents in medicine. Achieving and developing highly stereoselective synthesis of organic compounds and drugs by adopting environmentally. Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.
98	CHE EC 404	Practical I	2021	Knowing the basic principles of conductometry and analysis of acids and halides. Colorometric estimation of iron and manganese. Having an idea about working principles of IR, AAS, Spectrofluorimetry, Gas chromatography and HPLC.

				Familiarizing with interpretation of data
99	CHE EC 405	Practical II:Project Work	2021	Identifying research problem, propose the hypothesis and to collect literature. Performing research designs & experiments Tabulating research results Concluding research outcomes in the form of dissertation.
100	CHE EC 406A	Drug Chemistry	2021	Knowing about natural products. Knowing Interpretation of cardiovascular drugs. Knowing the Analyzing about prostaglandins. Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.
101	CHE EC 406	Electroanalytical Techniques	2021	Gaining ability to interpret potentiometry and conductometry Interpretation of results while adhering to DC Polarography. Analysing and compiling the data and results in polarography. Familiarizing Types of ion sensitive electrodes.

33. Environmental Sciences

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ENV-101	Ecology and Environment	2021	<ul style="list-style-type: none"> • Provide solutions to environmental problems using appropriate tools and techniques. • Develop both a quantitative and qualitative understanding of interactions between organisms and their consequences. • Gain the knowledge of functions of organisms and ecosystem.
2	ENV -102	Environmental Chemistry	2021	<ul style="list-style-type: none"> • Demonstrate knowledge of chemical and biochemical principles of fundamental environmental processes in air, water and soil. • Apply basic chemical concepts to analyze chemical processes involved in different

				<p>environmental problems.</p> <ul style="list-style-type: none"> • By knowing pollution levels in the environment best possible fresh environment can be created in different methods like afforestation, natural parks and sanctuaries etc., for human concern.
3	ENV-103P	Practical – I	2021	<ul style="list-style-type: none"> • Imparting practical knowledge about estimation of pH, Total Dissolved Solids, Hardness and Dissolved Oxygen, Chlorides and Sulphates in water samples.
4	ENV-104P	Practical-II	2021	<ul style="list-style-type: none"> • Understanding of various alkalinities present in the water sample by volumetric titration linked with theory. • By knowing water pollution potable water can be drawn out and wastewater can be treated. • By knowing various fertility of the soil can be known which is advantage to farmers for agriculture.
5	ENV-105	Environmental Toxicology and Public Health	2021	<ul style="list-style-type: none"> • To understand the role of toxicants in environment, methods used to quantify toxicity, regulations that govern toxic substances and assessment of risks posed by exposure to toxicants. • Inform, educate, and empower people about the potential hazards of toxic substances to environmental and human health. • By knowing the adverse health problems on human beings, safety, preventing measures can be implemented endemic and pandemic diseases can be controlled.
6.	ENV-106	Biodiversity and Conservation and Management	2021	<ul style="list-style-type: none"> • Systematically understand biodiversity and its vital role in ecosystem function. • Understand the value of biodiversity and current threats to biodiversity.

				<ul style="list-style-type: none"> • Describe Environment of nature.
7	EN-201	Energy and Environment	2021	<ul style="list-style-type: none"> • Explain the key challenges and technologies in energy use, utilization of energy resources, energy conversion and environmental consequences. • They explain basic competence regarding environmental impacts arising from different energy carriers and technical solutions. • Enrichment of ecosystem will be achieved.
8.	ENV-202	Environmental Pollution	2021	<ul style="list-style-type: none"> • Analyze sources of pollution, exposure pathways, fate and evaluate consequences of human exposure to pollution and its impacts to environmental quality. • Distinguish the effect of pollutants on human health, economy and wild environments. • Pollution free environment for human life will be achieved.
9.	ENV-203P	Practical-I	2021	<ul style="list-style-type: none"> • Describe the amount of pesticide/insecticide in water/vegetable samples. • To find concentration levels of toxicant by use of instrumental techniques • To estimate physicochemical assessments in different water samples
10.	ENV-204P	Practical-II	2021	<ul style="list-style-type: none"> • Identify the concentration of biochemical by using instrumental methods. • To find an amount of LC50 of various metals in organism. • To estimate the growth rate of fauna at various habitat condensations.
11	ENV-205	Instrumental Techniques and Applications	2021	<ul style="list-style-type: none"> • Integrate a fundamental understanding of the underlining physics principles as they relate to specific instrumentation used for atomic,

				<p>molecular, and mass spectrometry, magnetic resonance spectrometry and chromatography.</p> <ul style="list-style-type: none"> • Environmental potentiality will be achieved. This is indirect benefits to the society. • To understand the analysis and level of concentration of different metals through instrumental techniques.
12	ENV-206	Environmental Laws, Policies and Legislation	2021	<ul style="list-style-type: none"> • Understanding judicial response to environmental issues in India. • Acquire the ability to evaluate the role of law and policy in conservation and management of natural resources and prevention of pollution.
13	ENV -301	Waste Treatment and Management	2021	<ul style="list-style-type: none"> • Describe the components of solid waste management and the laws governing it. • Discuss the solid waste collection systems, route optimization techniques and processing of solid wastes. • Biodegradation of waste through natural and artificial methods will be achieved.
14	ENV -302	Environmental Assessment, Audit and Economics	2021	<ul style="list-style-type: none"> • Explain the concepts about the Environmental Impact Assessment (EIA) and describe the environment laws, aims and the necessity of EIA. • Critically examine assumptions inherent in impact assessment, examine a range of environmental impact assessments and identify and explore impact assessment fields and approaches. • Understand the sustainable development and controlling environmental pollution.
15	ENV -303	Practical-I	2021	<ul style="list-style-type: none"> • Understand the degradation of natural resources by constructions of various projects. • Understand requirement of oxygen for growth of organisms to break down organic matter in wastewaters. • Describe the low cost wastewater treatment

				practices in water demand areas.
16	ENV-304	Basics of Statistical Methods and Computer Programmes	2021	<ul style="list-style-type: none"> • To provide an understanding on statistical concepts include measurements of location and dispersion, probability, probability distributions, sampling, estimation, hypothesis testing and multiple regression. • To define quantity of data, organize and summarize the data. • To provide computing ability to design for solution with appropriate requirements. • To provide skill in computing knowledge.
17	ENV-305A	Ecotourism and Eco-restoration	2021	<ul style="list-style-type: none"> • Describe the challenging in Eco-Tourism and wildlife tourism. • Understand values of wildlife and minimizing impact on natural ecosystem due to tourism. • It is joyful to public and society; Government economy also will be generated.
18	ENV-305B	Occupational Health and Industrial Safety	2021	<ul style="list-style-type: none"> • To provide knowledge in understand hazardous material in industrial area. • To understand general health education and surveillance. • To identify unrecognized hazardous materials in and around factory.
19	ENV-305C	Statistics, Computer Applications and Modeling	2021	<ul style="list-style-type: none"> • Analyze data using standard statistical techniques. • Utilize the Internet Web resources and evaluate on-line e-business system. • Environmental analysis, forecasting of the environment can be achieved.
20	ENV-306A	Natural Resources Conservation	2021	<ul style="list-style-type: none"> • Apply theories and methods with interdisciplinary approach towards natural resource management. • Critically examine the gap in the resource availability, use and conservation. • In conservation of the environment,

				employment can be generated.
21	ENV-306B	Environmental Education and Sustainability	2021	<ul style="list-style-type: none"> • Demonstrate an integrative approach to environmental issues with a focus on sustainability. • Communicate complex environmental information to both technical and non-technical audiences. • Students will be enriched about the nature.
22	ENV-401	Water Resources and Watershed Management	2021	<ul style="list-style-type: none"> • Understand water's importance as a precious resource. • Provide a basic understanding of the impact of water and water-related issues in a global, economic, environmental and societal context. • Describe the management of water resources through construction of watersheds for future generations.
23	ENV-402	Remote Sensing and GIS	2021	<ul style="list-style-type: none"> • Building a foundation for understanding Remote Sensing and Geographic Information System (RS-GIS) as a powerful tool for geospatial analysis. • Appreciate the application of RS-GIS techniques to the matrices of environment and Resource management. • Future predictions of the environment will be known about weather, cyclones and research etc.,
24	ENV-403	Practical-I	2021	<ul style="list-style-type: none"> • Analyze the multi elements in various wastewater samples. • Understand the rain water harvesting practices. • Identify the water bodies and evaluate effective sensors and advance technique to extract and mapping the features for various

				applications.
25	ENV-404	Project Work and Comprehensive Viva-Voce	2021	<ul style="list-style-type: none"> • Understand project characteristics and various stages of a project. • Estimate and cost the human and physical resources required and make plans to obtain the necessary resources. • It helps to develop in contextualization of knowledge, critical thinking and can lead to new innovation ideas.
26	ENV-405 A	Disaster Mitigation and Management	2021	<ul style="list-style-type: none"> • Understand the mitigation approaches, their choices and alternatives. • Develop foundations for hazard, risk and vulnerability assessment.
27	ENV-405 B	Environmental Safety	2021	<ul style="list-style-type: none"> •
28	ENV-405 C	Environmental Management and Sustainable Development	2021	<ul style="list-style-type: none"> • Ability to analyze environmental management in relation to the major principles of sustainable development. • The ability to work effectively to create environmental management analysis outputs of professional quality, both independently and within team environments.
29	ENV-406 A	Forest Resources and Management	2021	<ul style="list-style-type: none"> • Demonstrate knowledge of forest vegetation modeling and the ability to forecast its development over time using models of forest growth. • Integrate knowledge of basic biology, physical sciences, forest and wildlife ecology, and social sciences into the stewardship of forest resources. • Through forest management national economy will be improved.
30	ENV-406 B	Global Environmental Issues	2021	<ul style="list-style-type: none"> • Predicting the consequences of human actions on the web of life, global economy and quality of human life. • Developing critical thinking for shaping strategies (scientific, social, economic and

				<p>legal) for environmental protection and conservation of biodiversity, social equity and sustainable development.</p> <ul style="list-style-type: none"> • International issues will be understood.
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34. Fishery Sciences & Aquaculture

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	AQC 101	Concepts of Aquatic Ecology	2021	<p>i. Understanding the General Characteristics, Principles of classification, Aquatic EcologyCommunities.</p> <p>ii. To understand the various Physical and chemical characteristics of water.</p>
2	AQC 102	Systematics And External Anatomy of Cultivable Organisms	2021	<p>i. Understand the concepts of finfish and shellfish systematics and anatomy.</p> <p>ii.</p> <p>iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations, Natural Selection and Genetic drift.</p> <p>iv. Understood the concepts of Micro, Macro evolution speciation categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.</p>
3	AQC 103 A	Fish Nutrition and Water Quality Management	2021	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. Understanding the comparative aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in</p>

				<p>taxonomy related research and job opportunities.</p> <p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p>
4	AQC: 103 B	Environmental Monitoring and Bio deterioration	2021	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight into biological processes.</p> <p>iv. Understood that the four propositions underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
5	AQC- 104A	Coastal Aquaculture	2021	<p>i.The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to</p>

				<p>perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p>
6.	AQC 104 B	: Ornamental Fish Culture	2021	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
			2021	
7.	Practical-1 AQC 105	Identification and Morphology of Cultivable Organisms	2021	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the ultra-structural information of animal cell besides the detailed views of the cell interior revealing the various events and actions of cell at the molecular level.</p> <p>iii. The study will help the students to</p>

				<p>understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the principles of Graft rejection, Auto immunity and Antibody based therapy.</p>
8.	Practical-2AQC106	Fish Nutrition	2021	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p> <p>ii. Students world gain expertise in understanding the complex molecular mechanisms occurring in cell and the applications of molecular technologies for betterment of life.</p> <p>iii. Understand and our apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the health Professions.</p>
9.	AQC 107	Human Values and Professional Ethics – I	2021	<p>i. Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they</p>

				<p>will also know the various tools and techniques related to bacterial microbiology.</p> <p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p>
10.	AQC 201	Principles of Aquaculture	2021	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fullest.</p> <p>iii. Learn the fundamental principles of immune response including molecular, biochemical and cellular basis of immune homeostasis.</p> <p>iv. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.</p>
11	AQC 202	Physiology of Cultivable Organisms	2021	<p>i. In depth understanding of Anatomical features of Integumentary, Circulatory, Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.</p> <p>ii. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p>

				<p>iii. An appropriate understanding of functioning of each system of different groups of animals with their comparison will be acquainted.</p> <p>iii. Understanding of the basic concepts of Physiological regulation, from cellular to organ to organismal.</p> <p>iv. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet.</p>
12	AQC 203A	Fresh Water Aquaculture	2021	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	AQC 203B	Capture fisheries	2021	<p>i. Students would gain expertise in explaining how a variety of interacting processes generate an organism's heterogenous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p> <p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity complex and coordinated systems in organisms the students can apply this</p>

				knowledge for research, and education, to solve the problems related to development in animals through research.
14	AQC 204 A	Fishery Economics, Extension and Environmental Management	2021	<p>i. Students will be able to apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.</p> <p>ii. Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.</p> <p>iii. Students will be able to be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p> <p>iv. Students will be able to use technology, such as geographical information systems and computer programming, to assist in problem solving.</p>
15	AQC 204 B	Limnology	2021	<p>i. Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p>

				iv. Students would gain basic knowledge of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study and understanding of life processes.
16	Practical-1 AQC205	Soil and Water Characteristics	2021	<p>i. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to Education, Research and Extension programmes in his further career.</p> <p>ii. Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>iii. Students learn about enzymes. Their classification and nomenclature</p> <p>iv. Students learn about specificity of enzymes</p> <p>v. Students learn about measurement of enzymatic activity</p> <p>vi. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.</p>
17	Practical-2 AQC206	Physiology of Fin Fish and Shell Fish	2021	<p>i. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>ii. Identify and describe the different equipment and tools used in a biology laboratory.</p> <p>iii. Correctly operate different laboratory instruments.</p> <p>iv. Correctly operate different types of microscopes.</p>

				v. Prepare tissue for section cutting and correctly operate a microtome.
18	AQC 206	Human Values and Professional Ethics – II (Audit course)	2021	<p>i. Students gain knowledge about regulation of enzyme activity with respective mechanisms</p> <p>ii. To understand about mechanism of enzymes in clinical diagnosis and their applications</p> <p>iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.</p>
19	AQC 301	Microbiology and Fish Pathology	2021	<p>i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology.</p> <p>ii. Describe different methods of data handling using computer.</p> <p>iii. Perform basic operations of gene sequence retrieval and compare them using different software.</p> <p>iv. Perform basic operations of protein structure retrieval and comparison using different software.</p> <p>v. The student will learn about the Computer basics like Operating systems, Programming, Data Access, Internet and Nucleic acid Sequence and Protein Data Banks.</p> <p>vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of dispersion like Mean deviation and Standard deviation and Co-efficient of Variation.</p> <p>v. The course will aid in learning Test of significance like Null hypothesis and Alternative hypothesis, t-test, F-test, Chi-square test, Correlation and Regression analysis.</p>

20	AQC 302	Fish Immunology	2021	<p>i. Creating the self-employment opportunities to rural students through Animal husbandry, Aquaculture, Vermiculture and Sericulture.</p> <p>ii. To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices.</p> <p>iii. Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.</p>
21	AQC: 303A	Cell Biology and Genetics	2021	<p>i. To understand the different pathogens causing disease in man.</p> <p>ii. Describe the different parasites causing disease and disability in man and animals.</p> <p>iii. Ability to elaborate about the life cycle and biology of disease carrying vectors; suggest preventive and control measures for the said diseases.</p> <p>iv. An understanding of the relationship between changes in physiology of host and</p> <p>v. The students after completion of the course based on the Expertise he/she may join as Parasitological Scientist.</p>
22	AQC 303 B	Bioinformatics In Aquaculture	2021	<p>i. Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment</p> <p>ii. Explain the importance of environmental audits and other management tools in business for social benefit by improving environmental performance</p> <p>iii. Calculate the carbon footprint of any organization and identify suitable mitigation</p>

				strategies for carbon reduction solutions.
23	Practical's AQC 304	Microbiology and Fish Diseases	2021	<ul style="list-style-type: none"> i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials ii. Students learnt and gain knowledge on structure and function of different types of Synapses iii. Gained information on different types of Neurotransmitters i.e. Amino acids and Peptides.
24	Skill oriented course AQC 305	Fish Nutrition Technology	2021	<ul style="list-style-type: none"> i. The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research. ii. Understanding of the physiological and genotoxic effects of drugs and environmental toxins. iii. To understand various types of insecticides and understand their mode of action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible with other control strategies. iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.
25	Open Elective (For other	a)AQC 306A: Fish Processing Technology	2021	<ul style="list-style-type: none"> i. Learnt about structure, function and organization of Neurons in the Central nervous

	department students)	b) AQC306B: Pollution and Toxicology		<p>system</p> <p>ii. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials.</p> <p>iii. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny.</p> <p>iv. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effective communicate with both specialist and non-specialist audiences/community.</p>
26	AQC 401	Aquaculture Biotechnology	2021	<p>i. Skill development in environmental and occupational Toxicology.</p> <p>ii. It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain.</p> <p>iii. Identification of different routes of exposure of environmental toxins.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p> <p>v. To understand the overview of Animal Behavior and prominence of social organization in insects and primates.</p> <p>vi. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>vii. To understand how to conserve the wild animals</p>
27	AQC402	Essentials Of Biochemistry	2021	<p>i. Understanding of in vitro culturing of</p>

				<p>organisms and production of transgenic animals.</p> <p>ii. Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors.</p> <p>iii. This insight allows students to take into consideration about ethical issues involved in production of transgenic animals and BT products.</p> <p>iv. Use in gene transfer technology, genetic manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p> <p>v. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny</p> <p>vi. Classify the nutritional types of microorganisms and measure microbial growth</p> <p>vii. Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>viii. Assess impact of plant- microbe interaction on agriculture in both beneficial and detrimental ways. Identify industrially important microbes.</p>
28	AQC403A	Computer Applications, Information Technology And Biostatistics In Aquaculture	2021	<p>i. Understand the overview of Animal Behavior and prominence of social organization in insects and primates</p> <p>ii. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>iii. To understand the how to conserve wild animals and management strategies.</p> <p>iv. To gain the knowledge about wild animals and animal products importance.</p>
	AQC403B	Aquaculture Engineering		
29	Practical's AQC 404	Biotechnology And Biochemical Estimations	2021	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of</p>

				<p>metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic pathways.</p> <p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
30	Multidisciplinary course/ project work AQC405	Project Work / Fieldwork	2021	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p> <p>ii. Students will be able to perform basic genetic engineering experiments at the end of course.</p> <p>iii. Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.</p>
31	Open Elective (For other department students) AQC 406(A)	General Principles and Practices of Aquaculture	2021	<p>i. Understand the evolution of protein structural motifs and domains and associate this with function;</p> <p>ii. Use on-line structural databases and tools to predict the properties, structure and function of proteins.</p> <p>iii. Understand and explain enzyme mechanisms in a structural context.</p> <p>iv. Describe mechanisms of protein folding and the roles of natively unstructured proteins in biology.</p> <p>v. Understand how cross-talk between proteins and post-translational protein modifications (e.g. phosphorylation, ubiquitination) facilitate information processing in cells.</p>
32	AQC 406 (B)	Fish Breeding and Hatchery Management	2021	<p>i. To understand the basic concepts of Infectious diseases and the role of immunity to control infections</p>

				<p>ii. Provides knowledge on the physiological mechanisms leading to diseased conditions.</p> <p>iii. Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv. This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>
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35. Geography

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	GEG-101	Geomorphology	2021	<ul style="list-style-type: none"> • Explain principal terms, definitions and theories in geomorphology. • Explain the interior structure of the earth and geological time scale. • Assess the cause and effect of disturbances in/on the earth. • Explain different theories and models for landscape evolution with time. • Describe the landform and landform processes in different climatic zones and tectonic regimes. • Compare and discuss the formation of large scale landforms involving both exogenous and endogenous processes. • Know how human, physical and environmental components of the world interact.
2	GEG-102	Cartography	2021	<ul style="list-style-type: none"> • Explain the importance of advanced cartography in map making and presenting. • Acquire good knowledge about different procedure of map making and various projection system of map making by developing broad knowledge about latitude, longitude, meridians, parallel etc. • Developing their quantitative application in geographical study which gives more accuracy in any geographical enquiry which can further helps students in conducting research activities. • Perform map layout and map interpretation for any geographical area.

				<ul style="list-style-type: none"> Acquire knowledge of different methods of surveying and mapping by using proper tools and techniques and can apply this knowledge in future research works.
3	GEG-103(A)	Economic Geography	2021	<ul style="list-style-type: none"> Explain the importance of economic geography in analyzing the societies and economies work. Explain and apply key concepts and theoretical approaches in economic geography. Discuss and critically evaluate these concepts and theoretical approaches. Students will become sensitized to concept of resources. Students will become sensitized to the classification of resources. Learn about use and misuse of resources. Will learn conservation methods and techniques. Showing an awareness and responsibility for the environment. Apply these concepts and theoretical approaches to key social and economic issues in the context of global economy. Discuss policy options for overcoming inequality and uneven development in the globalizing world
4	GEG-103(B)	Human Geography	2021	<ul style="list-style-type: none"> Apprise the student to various aspects of human resources and their importance. Illustrate basic concepts and key theoretical approaches in population. Describe migration and its impact on the regional human resources.
5	GEG-103(C)	Environmental Geography	2021	<ul style="list-style-type: none"> Gain the knowledge on environmental aptitude Familiarize with concepts, issues, approaches about physical and social environment. Acquainted with contemporary environmental problems and challenges. Familiarized the knowledge on Ecosystem, Biomes, food chain and hydrological cycle.
6	GEG-104(A)	Oceanography	2021	<ul style="list-style-type: none"> Examine and compare the different ocean and water bodies with their distinct oceanic bottom relief, circulation system and marine deposits Improve the knowledge on Coral reefs and their formation theories..
7	GEG-104(B)	Computer Basics for Geography	2021	<ul style="list-style-type: none"> Understand computer concepts and principles. Examine and compare the different computer programmes and usage of computer to geographical studies Improve the knowledge on computer networkings

8	GEG–104(C)	Regional Geography of Andhra Pradesh	2021	<ul style="list-style-type: none"> • Understand re-organization of Andhra Pradesh and its new physical, climate and drainage aspects.. • Obtain the knowledge of demographic, irrigation and major crops. • Understand Andhra Pradesh mineral and industrial aspects with transportation. • Improved knowledge on the transportation and communication aspects of Andhra Pradesh
9	GEG– 105	Map Projections	2021	<ul style="list-style-type: none"> • Explain the concept of map, scale and projection • Student can explain the purpose of projection • The main outcome of this course is students can able to select different projection for different geographical areas
10	GEG– 106	Techniques of Mapping and map analysis	2021	<ul style="list-style-type: none"> • Students can able to Represent the land forms with contour lines • Student can perform profiles which are drawn from land forms through contours • Student can represent the slope analysis models • Students can able to understand how to represent the data through different diagrams and graphs
11	GEG-201	Climatology	2021	<ul style="list-style-type: none"> • Obtain the knowledge of fundamentals of atmospheric phenomena, global climate systems and climate change. • Understand the atmosphere and climate are a critical part of the earth system, and climatic variability and change are central to the issue of current and future global environmental change. • Grasp the techniques for modeling the climate, covering both the theoretical and technical aspects. • Understand the dynamics of the atmosphere, the ocean and the overall climatologically system. • Able to analyze and interpret climatic data and classification of climate
12	GEG-202	Geographical Thought	2021	<ul style="list-style-type: none"> <input type="checkbox"/> Understand the evolution of geography over the decades. <input type="checkbox"/> Students will demonstrate an advanced understanding of the historical development of geographical studies. <input type="checkbox"/> They can understand the major current philosophical and theoretical debates in

				<p>eography.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Students will demonstrate an understanding of current research within the breadth of geography, as well as more in-depth knowledge of research in their specialty areas. <input type="checkbox"/> Students will develop a solid understanding of the concepts of “space,” “place” and “region” and their importance in explaining world affairs. <input type="checkbox"/> Improve knowledge on the quantitative revolution in the geographical studies.
13	GEG–203(A)	Principles of Remote Sensing	2021	<ul style="list-style-type: none"> <input type="checkbox"/> Understand the principles of remote sensing and its techniques. <input type="checkbox"/> Student will be able to know the apply the technique of remote sensing in various fields. <input type="checkbox"/> Student can apply the knowledge in getting authentic data by performing pre and post analysis in aerial remote sensing. <input type="checkbox"/> Student will analyze the changes on earth's surface with the image interpretation and visual interpretation techniques. <input type="checkbox"/> With the sound knowledge on the process, principles, effecting factors, techniques of Remote sensing student can understand interpretation of the data in much more accurate.
14	GEG–203(B)	Geography of Tourism	2021	<ul style="list-style-type: none"> <input type="checkbox"/> Understand the evolution of tourism geography over the decades. <input type="checkbox"/> Students will demonstrate understanding of the tourism and economic importance. <input type="checkbox"/> They can understand the tourism impact on the HRD. <input type="checkbox"/> Students will develop a concrete understanding of tourism and infrastructural need
15	GEG–203(C)	Industrial Geography	2021	<ul style="list-style-type: none"> <input type="checkbox"/> Understanding about industrial Geography. <input type="checkbox"/> Can familiarize the students with industrial location theories, in industrial geography. <input type="checkbox"/> Improve the knowledge on industrial classification. <input type="checkbox"/> Enhance knowledge on industrial regions and imbalances in India.
16	GEG–204(A)	Physical Geography of India	2021	<ul style="list-style-type: none"> <input type="checkbox"/> Conceptualize the elements of physical features of Indian geography. <input type="checkbox"/> Visualize and recognize the major topographical, geological, soil and natural vegetation regions of India. <input type="checkbox"/> examine the various issues, problems and challenges associated with the physical regions.
17	GEG–204(B)	Regional Geography of India	2021	<ul style="list-style-type: none"> • Developed the art of regionalization technique while focusing about diversity of Indian region.

				<ul style="list-style-type: none"> visualized and recognized about regional identities and socio-cultural dimension of regionalization to address the issues and concern needed for regional planning.
18	GEG– 204(C)	Social and Cultural Geography	2021	<ul style="list-style-type: none"> Assess the casual role of Geography in production of different social groups and shaping of their unique features. Evaluate the emerging social spaces, stratification, social well being, and issues of social justice through spatial perspective.
19	GEG– 205	Interpretation of Topographical (S.O .I., U.S and O.S) and Weather Maps	2021	<ul style="list-style-type: none"> Explain the elements, scale and numbering of Topographical maps Analyse and interpret the physical and cultural features from Indian, U.S and O.S Toposheets. Explain the elements of weather maps and analyse and interpret the weather maps
20	GEG– 206	Research Techniques	2021	<ul style="list-style-type: none"> Keeping in view the nature of data and purpose of study and to make a rational choice amongst listed various statistical methods. Students shall know how to organize, manage, and present data. Understand and use different research techniques in their researches and day today needs. Use different agricultural methods in their research and needed situations.
21	GEG– 301	Urban Geography	2021	<ul style="list-style-type: none"> Learn the concept of urban settlements and evolution of urban population and to provide concept of Urban studies Understand the cause and effects of growth in urban population Explain the theories involved in classification of towns and relationship between towns and cities and their population. Distinguish patterns of World urbanization with reference to India.
22	GEG– 302	Geographical Information System (GIS)	2021	<ul style="list-style-type: none"> Understand the evolution of GIS. focus on collection, analyzing, interpretation and presenting the data related to Earth.

				<ul style="list-style-type: none"> • Differentiate the types of data collection with respect to time and terrain and Data basemanagementand retrieving the data from different sources. • Improve knowledge on the Modeling surfaces and integration of Remote sensing with GIS. • Develop skill on GIS Applications in different sectors.
23	GEG–303(A)	Agricultural Geography	2021	<ul style="list-style-type: none"> • Know evolution of Agriculture through at the different ages and approaches. • Understand the concepts and importance of determinants in different cropping patterns. • Differentiate the Determinants of Agriculture • Understand agricultural location theories also the problem and prospects of Indian Agriculture.
24	GEG–303(B)	Transport geography	2021	<ul style="list-style-type: none"> • Know evolution and development of Transport through at the different ages and approaches. • Understand the concepts and importance of determinants in different transport patterns. • Differentiate the Determinants of transport and trade. • Understand transport theories also the problem and prospects of Indian transport..
25	GEG–303(C)	Disaster Management Studies	2021	<ul style="list-style-type: none"> <input type="checkbox"/> Develop the skill of understanding about natural calamities and disaster and also realize the consequences as well as preparedness. <input type="checkbox"/> Improve awareness on human and natural disasters <input type="checkbox"/> Understand classification of disasters and its impacts and management of disasters
26	GEG–304	Geographical Information System (GIS)	2021	<ul style="list-style-type: none"> • Acquaint knowledge about especially Geographic Information System (GIS) softwares. • Develop the skill of geo-referencing and creation of different data files. • Improve the practical knowledge on attributed data and linkage. • Develop the skill on analysis methods of GIS.
27	GEG–305	GPS Survey and Report	2021	<ul style="list-style-type: none"> • Develop the skill of understanding GPS and Survey. • Generate awareness on post processing of GPS data and collection of data from GPS survey. • Develop skill of report writing by using GPS data and software and hardware.

28	GEG–306(A)	Regional Geography of Andhra Pradesh	2021	<ul style="list-style-type: none"> <input type="checkbox"/> Develop the understanding about physical features of Andhra Pradesh.. <input type="checkbox"/> Familiarize the students with physiography, Drainage, Climate, soil and natural vegetation of Andhra Pradesh. <input type="checkbox"/> Visualise the population, mineral and transportation structures in Andhra Pradesh
29	GEG–306(B)	Geographical Information System (GIS) & Global Positioning System (GPS) and Applications	2021	<ul style="list-style-type: none"> <input type="checkbox"/> Understand the evolution of GIS. <input type="checkbox"/> Focus on collection, analyzing, interpretation and presenting the data related to Earth. <input type="checkbox"/> Differentiate the types of data <input type="checkbox"/> Improve knowledge on the Modeling surfaces and integration of Remote GPS with GIS. <input type="checkbox"/> Develop knowledge on GIS and GPS applications in different sectors.
30	GEG–401	Regional Planning	2021	<ul style="list-style-type: none"> <input type="checkbox"/> Acquire a solid base of knowledge in the principles and practices of Regional planning. <input type="checkbox"/> The skills necessary for the effective practice of planning, including its purpose, meaning, elements of plans; adoption, administration, and implementation of plans. <input type="checkbox"/> Develop the values necessary for the effective practice of planning, including problem-solving skills; research skills; written, graphical, and oral skills; computational skills. <p>Learn the values and ethical standards affecting the practice of planning</p>
31	GEG–402	Advanced Remote Sensing	2021	<ul style="list-style-type: none"> • Demonstrate knowledge of the foundations and theories of Photogrammetry, aerial photography and remote sensing. • Acquire knowledge of physical geography and the methods and techniques for observing, measuring, recording and reporting on geographic phenomena. • Demonstrate their competence to work individually and as a team to develop and present a client-driven GIS solution. • Prepared to apply their skills in professional careers.
32	GEG–403(A)	Water and Soil Resources Management	2021	<ul style="list-style-type: none"> • Apprise the students to various water resources related aspects and hydrological cycle. • Focus on groundwater and soil specifications.

				<ul style="list-style-type: none"> • Develop skill of water and soil management and to study on some case studies.
33	GEG–403(B)	Political Geography	2021	<ul style="list-style-type: none"> □ Apprise the Students will be able to critically examine the geographical bases of political studies. □ Able to evaluate and correlate different theories with contemporary geopolitical and geo-strategic issues.
34	GEG–403(C)	Research in Geographical Studies	2021	<ul style="list-style-type: none"> □ Explain the historical evolution, of research in Geographical studies.. □ Understand about ethics, methods and factors in geographical research. □ Improve the knowledge about forms of research and design. □ Illustrate research methods and data collection. □ Acquaint research analysis and report writing.
35	GEG=404	Remote Sensing Applications	2021	<ul style="list-style-type: none"> □ Explain practical knowledge on Remote sensing applications... □ Understand Visual and digital interpretation of satellite Images. □ Illustrate interpretation of Aerial photos. □ Acquaint knowledge on allocation of RS in different fields and sectors.
36	GEG–405	Project Work and Viva Voce	2021	<ul style="list-style-type: none"> □ Develop geospatial technologies applications in different geographical areas. □ Understand Selection of the project, complete the project and report writing.
37	GEG–406(A)	Regional Geography of India	2021	<ul style="list-style-type: none"> □ Explain practical knowledge on Remote sensing applications... □ Understand Visual and digital interpretation of satellite Images. □ Illustrate interpretation of Aerial photos. <p>Acquaint knowledge on allocation of RS in different fields and sectors</p>
38	GEG–406(B)	Principles of Remote Sensing	2021	<ul style="list-style-type: none"> □ Develop knowledge on history and evolution of Remote sensing □ Explains the principle involved in remote sensing i.e. the Electromagnetic spectrum, reflection, refraction, diffusion, absorption and interaction with earth's atmosphere. □ Understand knowledge on the platforms and sensors and instruments used for remote sensing □ Illustrate about the specifications remote sensing different satellites.

36. Geology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	GEO-101	Geomorphology and Paleontology	2021	<p>1) Able to explain conceptual approaches in geomorphology.</p> <p>2) Able to describe land forms and land forming processes in different climate zones and tectonic regimes.</p> <p>3) Able to explain different theories and models for landscape evolution.</p> <p>4) Obtain knowledge in recognizing and minimizing the mass wasting.</p> <p>5) Able to apply geomorphological concepts in economically important projects.</p> <p>6) <i>Palaeontology</i> is the study of prehistoric species, mostly ones that are extinct. It focuses primarily on fossil data, using a variety of physical, chemical and biological.</p> <p>7) Paleontology has essentially three basic goals: (1) to describe the world's past biodiversity; (2) to outline the history of life on earth; and (3) to develop new ideas about evolution and ecology.</p>
2	GEO-102	Crystallography & Mineralogy	2021	<p>1) Students will be able to describe crystal structures, crystal symmetry and twinning</p> <p>2) Students will learn the use of X-ray crystallography to determine the arrangement of atoms in a crystal.</p> <p>3) Students will be able to identify the mineralogical composition of geological materials by studying some of the optical properties and techniques in order to reveal their origin and evolution.</p> <p>4) Students will get thorough knowledge about the physical chemical and optical characteristics of minerals could lead to the discovery of new uses for Earth's mineral resources.</p>
3	GEO-103P	Crystallography & Mineralogy	2021	<p>1. The student understands the importance of minerals to society and to the study of the Earth.</p> <p>2. Can explain how the properties of chemical elements and their bonds regulate the structure and composition of minerals.</p> <p>3. Demonstrate how the crystal structure of minerals affects the external morphology and physical properties of a mineral (e.g. crystal symmetry, crystal habit).</p> <p>4. Identify various minerals using Physical properties.</p> <p>5. Identify various crystal forms shown by minerals belonging to different crystal</p>

				system.
4	GEO-104P	Geomorphology & Paleontology	2021	<p>1) The practical application of geomorphological science now forms river restoration and environmental protection.</p> <p>2) the extensive experience gained through field work, analysis and input to the design process to provide thorough understanding of geomorphology in the river environment and describe</p> <p>3) Paleontology is highly relevant to the modern and future world. We can learn how climate change has effected past organisms as well as how organisms have changed the physical world. We can also better understand the principles of extinction, evolutionary change, and biodiversity.</p> <p>4) Paleontological resources, or fossils, are any evidence of past life preserved in geologic context. They are a tangible connection to life, landscapes, and climates of the past. They show us how life, landscapes, and climate have changed over time and how living things responded to those changes.</p> <p>5) Paleontology lies between biology and geology since it focuses on the record of past life, but its main source of evidence is fossils in rocks.</p> <p>6) paleontology, also spelled paleontology, scientific study of life of the geologic past that involves the analysis of plant and animal fossils, including those of microscopic size, preserved in rocks.</p> <p>7) Body fossils and trace fossils are the principal types of evidence about ancient life, and geochemical evidence has helped to decipher the evolution of life.</p>
5	GEO-105	Stratigraphy & Paleontology	2021	<p>1) Students would have acquired comprehensive knowledge on principles of Stratigraphy, correlation methods classification of Stratigraphy units, tectonic framework of India and Geological timescale.</p> <p>2) Ability to give an account of various stratigraphic units and give stratigraphic column distribution in India, fossil content and economic importance of given geological formation.</p> <p>3) Apply standard stratigraphic codes while preparing geological reports</p> <p>4) Describe morphology, classification, evolutionary trends of Invertebrate fossils with geological and geographic distribution and paleoecological and paleo-environmental relevance.</p> <p>5) Ability to identify, classify and describe the morphology of the invertebrate</p>

				<p>fossils and plant fossils.</p> <p>6) Application of fossils in establishing the age of the rockunit, correlation with other area, and Use of fossil in finding mineral deposits.</p> <p>7) Ability to apply micropalaeotological techniques in hydrocarbon exploration.</p>
6.	GEO-106	Human Values & Professional Ethics-I	2021	<p>1) After completion of this course the students will be able to know the importance of Ethics and Human Values in various professions.</p> <p>2) Students also will get in depth knowledge and understanding of moral values and ethical code of the Indian Society. Especially embedded in various scriptures.</p>
7.	GEO-201	Structural Geology and Geotectonics	2021	<p>1) Able to demonstrate a basic understanding of stress, strain, rheology of earth's lithosphere and comprehend how to describe and classify brittle and ductile structures.</p> <p>2) Able to describe, identify and analyze the folds, faults and joints and their effects on outcrop pattern.</p> <p>3) Measure, plot and interpret structural field data and can relate these to geological Maps and knows how to read geological maps and geological cross-section.</p> <p>4) Obtain knowledge of shear zone characteristics and textures which are usually highly, Mineralized zones.</p>
8.	GEO-202	Remote Sensing and GIS	2021	<p>1) Develop knowledge in basics of Remote Sensing interpretation keys and applications.</p> <p>2) Formulate the relationship between EMR and satellite Remote Sensing.</p> <p>3) Application for Remote Sensing for important economic deposits.</p> <p>4) Operate GIS data model and demonstrate GIS techniques for various applications.</p> <p>5) Apply RS and GIS techniques to analyze the various geological materials.</p>
9.	GEO-203P	Structural Geology & Sedimentology	2021	<p>1) The interpretation of geological maps and determination of strike and dip, Borehole problems and apparent dip, plunge and pitch of linear structures</p> <p>2) Structural geology concepts and tools to understand rocks deformation in hot environments</p> <p>3) Structural geology with interpretations and simple geomechanical problems and solutions</p> <p>4) Structural geology issues related to new instruments in measuring structural data from rocks, paleomagnetic studies in tectonics field studies in structural geology interdisciplinary aspects of structural geology.</p> <p>5) Sedimentology encompasses the study of modern sediments such as sand, silt, and clay, and the processes that result in their formation (erosion and weathering), transport, deposition and diagenesis.</p>

				<p>6) Sedimentology, the study of sedimentary rocks and the processes by which they are formed, includes and is related to a large number of phenomena.</p> <p>7) Sedimentology includes the five fundamental processes defined by the term sedimentation --weathering, erosion, transportation, deposition and diagenesis.</p>
10.	GEO-204P	Remote Sensing and GIS	2021	<p>1. Understand the concepts of Photogrametry and compute the heights of objects</p> <p>2. Understand the principles of aerial and satellite remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies.</p> <p>3. Understand the basic concept of GIS and its applications, know different types of data representation in GIS.</p> <p>4. Understand and Develop models for GIS spatial Analysis and will be able to know what the questions that GIS can answer are.</p> <p>5. Apply knowledge of GIS software and able to work with GIS software in various application fields.</p> <p>6. Illustrate spatial and non spatial data features in GIS and understand the map projections and coordinates systems.</p> <p>7. Apply knowledge of GIS and understand the integration of Remote Sensing and GIS.</p>
11	GEO-205	Sedimentology	2021	<p>1) Able to identify different sedimentary rocks in both hand specimens and thin section and derive information on the depositional conditions and environments.</p> <p>2) Able to study the sequence of sedimentary rock strata and describe the tectonic framework of sedimentation to understand the earth's history including palaeoclimatology and history of life</p>
12	GEO-206	Human Values & Professional Ethics-II	2021	<p>1) After completion of this course the students will be able to follow and practice good behaviour with human values and moral support to their elderly family members.</p> <p>2) They also aware and get knowledge about medical ethics how the doctors will behave with patients, what type of ethics should be followed by business people. They also get in through knowledge about the protection of environment social ethics like family ethics, the role of print and electronic media in prevention and protection of Human rights in Indian society.</p>
13	GEO-301	Igneous Petrology	2021	<p>1) Acquire knowledge on the evolution of magma by different processes takes place from origin to emplacement with respect to different tectonic settings.</p> <p>2) Explain Igneous processes, formation, structures, classification and significance of texture in explaining rock history.</p> <p>3) Obtain knowledge on the crystallizing phase equilibrium of multi component magma system.</p>

				4) Identify different Igneous rocks both in handspecimens and thin sections in terms of their petrogenesis by studying the petrographic characteristics.
14	GEO-302	Metamorphic Petrology	2021	<p>1) This course has links directly with industry and share the knowledge about a wide range of ore deposits.</p> <p>2) Offers a detailed study of origin of economic mineral deposits its identification properties and distribution in India.</p> <p>3) Comprehensive knowledge in reflection light optic and ore textures.</p>
15	GEO-303P	Petrology	2021	<p>1) Describe the types and relative abundances of phases in a rock based on observations from hand specimens and thin sections</p> <p>2) Interpret the geologic history of igneous rocks based on mineral assemblage and textures using both hand sample and microscope techniques</p> <p>3) Use metamorphic mineral assemblages and textures to constrain deformation history and P-T conditions</p> <p>4) Use geochemical data (partition coefficients, REE plots, etc) to constrain petrogenetic processes</p> <p>5) Integrate their research findings with those of peers in developing a consensus model that (a) explains mineral occurrences and interplay (micro- and macroscopic) in field samples, and (b) holds up to public scrutiny (as a consensus model and as individual components) at a departmental mini-poster symposium</p> <p>6) Design and implement a field sampling campaign</p> <p>7) Use a portable X-Ray Fluorescence Spectrometer to collect elemental analyses</p> <p>8) Use MS Excel to organize, plot, and evaluate the petrogenesis of CRB using elemental data</p>
16	GEO-304P	Geochemistry	2021	<p>1) Geochemistry can play a key role in helping to protect the safety of drinking water by identifying the sources, concentration and forms of potentially harmful elements such as arsenic mercury and fluoride in natural water.</p> <p>2) Geochemistry and health establishes and explains links between the natural or disturbed chemical composition of the earth's surface and the health of plants animals and people.</p>
17	GEO-305	Geochemistry and Thermodynamics	2021	1) Understand the behavior of elements in a geochemical context and relate this knowledge to how elements redistribute within the Earth.

				<p>2) Learn to interpret and explain interactions between Earth reservoirs.</p> <p>3) Understand and interpret the major processes that form and modify the Earth's crust and mantle.</p> <p>4) Use isotopes to trace geological processes and age date specific events.</p>
18	GEO-306	Computer Applications and Geostatistics	2021	<p>1) Comprehend the database related to field geological data</p> <p>2) Prepare and Interpret graphical and pictorial data</p> <p>3) Exposure to some selected software's related to geology</p>
19	GEO-307	Dimensional Stones and Building Materials	2021	<p>1) Explain the distribution of dimensional stones and occurrence of construction materials</p> <p>2) Classify dimensional stones and construction materials</p> <p>3) Assess the suitability of various dimensional stones and construction materials</p>
20	GEO-308	Gemology	2021	<p>1) The course is focused on a comprehensive learning in gemology</p> <p>2) Understands the formation, classification and properties to final the grading and evaluation.</p> <p>3) Knowledge in order to identify original gemstones and stimulants</p> <p>4) Acquire skills which will be useful to them in gem industry</p>
21	GEO-309	Surveying and Field Geology	2021	<p>1) Understand the use of different surveying instruments, field equipment, aerial photographs and their use.</p> <p>2) Compute the area and earthwork for different works by using surveying instruments</p> <p>3) Analyze surveying techniques, tools, survey data and geological reports</p> <p>4) Prepare contour maps, geological maps and reports</p> <p>5) Solve survey issues using proper survey and interpretation.</p> <p>6) Use appropriate modern tools in surveying and mapping</p>
22	GEO-401	Economic Geology	2021	<p>1) Its chief objective is to guide the exploration for mineral resources and help determine which deposits are economically worthwhile to mine. Specialists in economic geology often assist in the extraction of the mineral commodities as well.</p> <p>2) <i>Economic geology</i> is concerned with earth materials that can be used for economic and/or industrial purposes. These materials include precious and base...</p> <p>3) Scientific discipline concerned with the distribution of mineral deposits, the economic considerations involved in their recovery, and an assessment of the reserves available.</p>

				4) Economic geology deals with metal ores, fossil fuels (<i>e.g.</i> , petroleum, natural gas, and coal), and other materials of commercial value, such as salt, gypsum, and building stone. It applies the principles and methods of various other fields of the geologic sciences, most notably geophysics, structural geology, and Stratigraphy . Its chief objective is to guide the exploration for mineral resources and help determine which deposits are economically worthwhile to mine. Specialists in economic geology often assist in the extraction of the mineral commodities as well.
23	GEO-402	Mineral Exploration, Mining Engineering & Geology	2021	<ol style="list-style-type: none"> 1) This course linked to industry and acquires knowledge on techniques to locate ore bodies, methods for mineral exploration and geologic aspects of drilling. 2) Acquire knowledge on geophysical methods for Ore reserve estimation. 3) Acquire knowledge on Ore beneficiation processes and techniques. 4) Confirm mining rules and regulations 5) Able to determine the suitable mining methods 6) Analyse different ores and ore beneficiation processes. 7) Understand the different engineering properties of rock types and role of geologists in selecting the sites for different major engineering projects.
24	GEO-403P	Economic Geology	2021	<ol style="list-style-type: none"> 1) This course has links directly with industry and share the knowledge about a wide range of ore deposits. 2) Offers a detailed study of origin of economic mineral deposits its identification properties and distribution in India. 3) Comprehensive knowledge in reflection light optic and ore textures. 4) Acquire practical knowledge on microchemical techniques for identification ores and estimation of ore reserves.
25	GEO-404P	Project Work	2021	<ol style="list-style-type: none"> 1) The project area covered by closepet granite, hornblende-biotite-gneisses is the predominant geological formations in this watershed area. 2) The rainfall of the area is not consistent, but found varying between 541 mm to 951 mm for Madire vanka watershed for 21 years. 3) For horticulture plantation like sweet orange and unirrigated crops, Contour cultivation contour bunding and Gully plugging etc, are suggested to facilitate the arrest of soil erosion and improve soil moisture regime. 4) Finally in water resource development plan one check dam and one percolation tank are recommended to regulate the surface water flow thereby increasing its influence over the command area and the ground water levels.

26	GEO-405	Hydrogeology	2021	<p>1) Apply the knowledge of geological formations and the hydrological properties of rocks</p> <p>2) Analyze the suitability of water for domestic, irrigation and industrial purposes Conduct geological and geophysical investigations and give recommendations for drilling of borewells.</p> <p>3) Explain causes of pollution of groundwater give remedial measures to the society.</p> <p>4) Use modern methods and appropriate techniques to carrying out geophysical studies and artificial recharge methods</p> <p>5) Students will get critical knowledge on evaluation of geological condition at the major engineering project sites.</p>
27	GEO-406	Environmental Geology & Natural Hazards	2021	<p>1) Explain different aspects of environment and local, regional and global environmental problems.</p> <p>2) Classify and explain the environmental pollution and disaster control technologies</p> <p>3) Prepare, interpret and implement environment projects</p> <p>4) Identify the natural and environmental disasters, its causes and apply preventive measures.</p> <p>5) Adopt the laws and regulations towards hazard management</p> <p>6) Able to prepare controls of mitigating toward natural disasters.</p>
28	GEO-407	Water Shed Management	2021	<p>1) Explain the importance of watershed management</p> <p>2) Classify and explain the different water harvesting techniques</p> <p>3) Use modern tools for land erosion control</p> <p>4) Develop or improve the people's participatory approach for sustainable development and management of watersheds.</p>
29	GEO-408	Medical Geology	2021	<p>1) Explain about relationship of human Health and Geological Processes.</p> <p>2) Able to understand the importance of the Water quality standards and impact of micronutrient deficiencies in soils and crops on human health</p> <p>3) Analyse the interaction of abundance of elements and geological effects.</p>
30	GEO-409	Fuel Geology	2021	<p>1) The course offers a detailed study about natural fuels like coal and petroleum their formation and distribution especially in sedimentary basins.</p> <p>2) Student shall benefit to have basic ideas about formations, nomenclature in constitution of coal working detail of distribution of coals and coal industry in India, Sufficient idea of formation and entrapment of oil and gas.</p> <p>3) Get elaborate knowledge about occurrence of atomic minerals in nature, methods of prospecting, atomic fuels and environment.</p>

37. Home Science

Food Science Nutrition & Dietetics

S. No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	FSND 101	Food Chemistry and Analysis	2021	Knowledge on chemical composition physical, chemical, and functional properties of Water, carbohydrate, Protein and Fats. Understand the principles and working applications of different analytical techniques associated with food. skills in qualitative and quantitative estimation of nutrients in different foods. This course gives on hands on experience which will help student to become food analyst at local, regional, national and global levels.
2	FSND 102	Clinical Nutrition and Dietetics-I	2021	The concepts of nutrition and its relation to health and describe the role and responsibilities of Dietitian in Hospital will be dealt. Knowledge related to Therapeutic modification of diets and Plan and prepare diet for different diseases conditions. This will help the students to get employability in hospitals and also start their own diet and nutrition clinics at local, regional and national level.
3	FSND 103 -A	Food Science and Experimental Foods	2021	This course will give knowledge on Plant and Animal foods composition, and processing techniques on nutritive quality of foods. Understand the principles of cookery of different foods and methods of evaluation. This course is prerequisite for skill development in Food Product development. Standardization and experimentation on different foods leading to physical, chemical and sensory changes can be understood leading to become food research analyst in industries at local, regional, national levels.
4	FSND 103- B	Baking Technology	2021	The process of baking and role of different ingredients for different baked products in this course will help the students to develop skills as entrepreneurs. The concepts and knowledge on process of baked products supply chain helps

				students for employability in baking industries at local and regional levels.
5	FSND 104 -A	Community Nutrition	2021	Nutrients in food, their functions and consequences of deficiency is included in this course. Developing skills for planning diets for nutritional disorders like PEM, Iron, Vitamin A and Iodine and the knowledge of techniques to assess the nutritional status of different age groups. Acquire knowledge on government programs to prevent nutritional disorders according to regional and national needs.
6	FSND 104 -B	Nutrition during Life span	2021	Knowledge on the importance of nutrition during life span is imparted in this course and enlightened the principles and working applications during dietary modifications and menu planning. Comprehensive knowledge on analyzing the nutritional requirements and evaluating diets for comparison with RDA and formulate dietary interventions to address nutritional deficiencies.
7	FSND 105	Practical I 101+103-A/103-B	2021	Developing skills in quantitative and qualitative analysis of foods and standardization of foods using different processing techniques is included along with skills in processing, preparation and evaluation of bakery products. This helps in employability and entrepreneurial opportunities for the students at food industries at local, regional, national and global levels
8	FSND 106	Practical II 102+104-A/104-B	2021	This course gives hands on experience in Therapeutic modifications of diet for different diseases by planning, preparing and evaluating. Community assessment skills in terms of anthropometry, dietary, clinical and biochemical for various disorders and planning programs for important days is given along with Applications of Computational skills in the Nutritional allowances during life span.
9	FSND 107	Human Values and Professional Ethics-I	2021	The students understand the importance of good character, conduct and values embedded in various religions . Demonstrate knowledge of ethical values in non-class room activities, internships and field work.
10	FSND 201	Nutritional Bio chemistry	2021	This course deals with the metabolism of nutrients such as carbohydrates, proteins, lipids, minerals and vitamins in human physiology acquire knowledge on factors affecting digestion, absorption of nutrients. Create awareness on enzymes and its role in nutrient metabolism gain knowledge on role of vitamins and minerals as coenzymes in metabolism.
11	FSND 202	Clinical Nutrition and Dietetics-II	2021	The concepts of dietary principles for various diseases and comprehend knowledge in Dietary modifications for the management of diseases is included in the course. Application of principals in preparation and service of diets to the patients and

				<p>assess the case studies and construct the diet charts will be explained. This course will be helpful in creating employability and entrepreneurship at regional and national level.</p>
12	FSND 203- A	Food Microbiology and Safety	2021	<p>Knowledge acquisition about important genera of microorganisms associated with food.</p> <p>This course makes the student to acquaint with the various factors associated with growth, food spoilage and food-borne diseases of different microorganisms and food contaminants and their sources.</p> <p>Gain knowledge on the characteristics of food borne diseases, infections and intoxications and their identification thereby creating an opportunity as food microbiologist in food industries at local and regional level.</p>
13	FSND 203 B	Nutrition in Emergencies And Disaster Management	2021	<p>This course helps to assess the emergency situations related to food and Nutrition in natural and manmade disasters and nutrition surveillance and treatment in emergencies.</p> <p>Knowledge on planning nutrition relief and rehabilitation in emergencies and develop skills in Nutritional epidemiological studies.</p>
14	FSND 204 A	Research Methodology	2021	<p>The concept of doing research and terms like 'variables', 'hypotheses, and 'research 'and different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research are dealt in this course.</p> <p>This course helps student to critically gain knowledge to select a sample by using different sampling methods like probability and non-probability sampling.</p> <p>Develop a research proposal in the appropriate scientific style to help students for skill development for higher learning.</p>
15	FSND 204 B	Statistics and Computer Applications	2021	<p>This course makes the student to understand about the scope of statistics in research, concepts of inferential statistics like t-test, chi-square, Correlation and Variance.</p> <p>Basics in computer and its application in statistics and development of skill in computing statistics by using statistical software will be imparted.</p>
16	FSND 205	Practical I 201+203-A/203-B	2021	<p>Developing skill and hands on experience in analysis of biochemical parameters in blood and serum will be carried out in this course along with standard methods and procedures for the microbiological analysis of food. Skill development in planning and Execution of nutrition epidemiological and rehabilitation studies in emergencies will be imparted</p>
17	FSND 206	Practical II 202+204-A/204-B	2021	<p>Explain concepts on Epidemiology and its application in planning programs during emergencies.</p> <p>Critically apply knowledge of application of statistics in data analysis using</p>

				computer applications for data analysis will be done.
18	FSND 207	Human Values and Professional Ethics-II	2021	Understand the importance of value education and ethics in medical, business, environmental and social fields. The students apply the knowledge while joining in any profession and will contribute to society as socially responsible citizens.
19	FSND 301	Food Processing and Preservation Technology	2021	The course illustrates the principles and scope of food processing and preservation along with various techniques/methods. Knowledge acquisition on advanced emerging technologies and their applications in food processing and preservation is imparted to the students.
20	FSND 302	Advances in Human Nutrition	2021	The course appraises the advanced concepts of nutrition of Brain, Immunity and Sports along with the concepts of dietary management in endemic nutrition problems. This course creates knowledge on the dietary management during emergencies and the process and relation of immunity and nutrition. This course also creates a platform for further research in Sports nutrition.
21	FSND 303-A	Nutrition Assessment Techniques	2021	Understanding the methods of nutritional status assessment like Anthropometry, Biochemical, Clinical and Dietary will be dealt in this course. Application of knowledge on assessment techniques of protein quality in diets and Plan nutrition research using animal models is given in this course along with designing in nutrition research using Human models.
22	FSND 303-B	Public Health Nutrition	2021	Acquiring insight into the public health problems and their implications and developing skills in organizing and evaluating nutrition projects in the community is acquired with this course. Appreciating the national and international contribution towards nutrition improvement in India and applying different assessment techniques for nutritional screening is given in this course.
23	FSND 304	301+302	2021	This course will equip the students with skills required for process and preserve various food products along with planning and preparation of foods in special needs like space, high altitudes and low temperatures.
24	FSND 305	Institutional Food Service Management(T)+ Practicals (P)	2021	The course will gain knowledge on the different types and management of food services and exposure to the dietary department in a hospital setting. Knowledge on finance, personnel management, duties and responsibilities of dietitians will be learnt. Gaining skills to act in a variety of capacities in clinical, administrative, and community settings and quantitative food production and planning diet plans for different diseases by placing in hospitals is practiced leading to employability at local, regional and national levels.

				Internship as dietitian in government and corporate hospitals give practitioner skills and hands on experience for entry-level dietitians who are able to assume leadership roles to improve and maintain the nutritional care of diverse individuals, families and communities within national and global populations.
25	FSND 306-A	Fundamentals of Food, Nutrition and Health	2021	The course will help students to gain knowledge on foods, food groups, balanced diet for different age groups and understand the importance of macro and micronutrients in daily diet. Comprehending knowledge on deficiency symptoms of different nutrients and developing skills and hands on experience to assess nutritional problems in community is included in the course.
26	FSND 306-B	Dynamics in Food Preparation	2021	The course makes the student to learn the principles of safe food preparation and food pyramid and understand the role of foods in cookery. Applying the knowledge about effect of cooking on nutrients and estimate the effects of cooking on Nutrients will be given as hands on experience.
27	FSND 401	Food Safety Standards and Quality Control	2021	This course includes the current food safety standards rules and regulations and gain knowledge on desirable and undesirable constituents and contaminants in foods. This course helps students to critical analysis on subjective and objective methods of quality of food and develop skills for quality analysis and assurance of food at national organizations like FSSAI.
28	FSND 402	Food Product Development and Marketing	2021	This course illustrates the new product categories in food market and their characteristics and elucidate the process of new food product development in food industry. Exemplifying various specialty food products and their applications and acquiring the skill to design and development of new food product and analyzing the quality of the product is imparted.
29	FSND 403-A	Nutrition for Health and Fitness	2021	The course defines the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation. Energy metabolism pathways during physical activity and describing the role of macronutrients in physical performance, weight management and obesity has been included. This course also explains the nutritional needs in different sports and the role of national agencies, thereby creating employability in Nutrition fitness centers at local, regional and national levels.
30	FSND 403-B	Geriatric Nutrition	2021	Understanding the physiological changes and theories of ageing and gaining knowledge on importance and consequences of diet in elderly is included in this course. Creating awareness on degenerative diseases, life style genesis and its

				management through diet and acquainting with the government programs and policies for elderly is included.
31	FSND 404	401+402	2021	This course helps students to critical analysis on subjective and objective methods of quality of food and develop skills for quality analysis and assurance of food. skill to design and development of new food product and analyzing the quality of the product is imparted.
32	FSND 405	Technology of Packaging(T+P)	2021	This course provide knowledge on packaging and packaging materials an overview of the scientific and technical aspects of food packaging. Enabling the students to understand the regulations of packaging and packaging material testing and applying skills of new innovations in food packaging to improve product stability and/or to extend the product shelf-life was included.
33	FSND 406-A	Child Growth and Development	2021	The course helps the students to know the terms growth, development and stages of development across life span and understand the characteristics of children at different stages of childhood Explaining the different developments like physical, cognitive, language and social development during childhood and applying knowledge to understand normal development and developmental delays during childhood is studied.
34	FSND 406-B	Disaster Management	2021	The course helps to know about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management and to understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters. Explaining the efforts made by the NGOs, Community based organizations and local administration in disaster management will be dealt in the course.

Human Development and Child Welfare

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	HDCW-101	Advanced Study of Child Development	2021	Students acquire the knowledge of holistic development of individuals from conception to adolescent period.The students can disseminate the knowledgeto teachersand parents regarding normal and delayed development among children. The students can apply skills when they serve as teachers at local level or as extension officers in national schemes like ICDS.

2.	HDCW-102	Curriculum for Early Years	2021	Students apply knowledge about appropriate approaches to teach pre- school children. They apply skills in the field of early childhood education, when they are placed as pre -school teachers at local level and as pre- school trainers at national level in Government organizations like ICDS or NGOs like Azim Premji foundation, PRATHAM, Bachpan etc.
3.	HDCW-103(A)	Family Dynamics	2021	Students will get knowledge related to issues in family and society and understand laws related to marriage and family. Students utilize this knowledge when they work in national organizations like social welfare board ,and family counseling centers and in non-government organizations catering to the family welfare at local level like PASS ,RASS etc.
4.	HDCW-103-B	Gender Issues in Human Development and Family Relations	2021	Students will be able to recognize the gender difference and gender issues in human development. This knowledge will help them to manage people with etiquette manner in personal and professional life.
5.	HDCW-104-A	Community Nutrition	2021	Students acquire knowledge about food groups, RDA and steps in planning a diet. The skills learnt in planning and calculation of nutritive values help when they work in local hospitals or in National programs like Zero budget natural farming , ICDS etc.
6.	HDCW-107	Human Values and Professional Ethics-I	2017	Students understand the importance of good character , conduct and values embedded in various religions . Demonstrate knowledge of ethical values in non-class room activities, internships and field work.
7.	HDCW-201	Quality Standards in ECE Centers	2021	Students will get knowledge about planning activities for pre-school children .They understand different ways of teaching stories ,rhymes etc using different audio-visual aids.apply skills in planning a day's activities for pre -school children , prepare Teaching Learning Material (TLM) and participate as student teacher in SVU Laboratory nursery school. The practical experience helps in establishing preschools, as entrepreneurs also to serve in Non Government institutions like Azim Premji Foundation, PRATHAM at national level and in Government sectors as extension officer at National level programs that are providing pre- school education
8.	HDCW -202	Theories of Human Development and Behavior	2021	Students describe different theories related to child development and understand the reasons for maladaptive behavior. Apply the knowledge of theories to understand the behavior of individuals and also in counselling , when they join as counselors at local schools and mental health institutions at regional level like VIMHANS ,Vijayawada , at national level like NIMH ,Hyderabad and at local level Child Guidance clinics run by Government hospitals like SVRR hospital.
9.	HDCW-203-A	Parent and Community	2021	Students gain knowledge about different child rearing practices and parenting styles adopted by parents. Gain skills in planning education materials for parents

		Education		,conductparent education programs in schools and community, when they work as a teachers at local schools. It helps to disseminate the knowledge related to impact of parenting styles on child behavior to parents , teachers and significant others in the community.
10.	HDCW-203-B	Infant Development and Stimulation	2021	Students gain knowledge of stimulation activities for physical ,language ,cognitive and social development of infants. The knowledge and skills will help to plan stimulation activities for infants ,when they establish crèche as entrepreneurs or serve in Day care centers.
11.	HDCW-204-A	Research Methodology	2021	Student gain knowledge about types of research ,different methods of sampling and preparation of schedules/questionnaires. The students get skills in preparation of a research proposal. The knowledge helps the students to write articles for journals at national and international levels.
18.	HDCW -207	Human Values of Professional Ethics -II	2017	Understand the importance of value education and ethics in medical ,business ,environmental and social fields. The students apply the knowledge while joining in any profession and will contribute to society as socially responsible citizens.
19.	HDCW -301	Child Study Techniques	2021	Students are capable to use standardized techniques for assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS ,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital.
20.	HDCW-302	Children with Developmental Challenges	2021	Students gain knowledge about the causes for various impairments and principles of assessment of children with disabilities and gifted children. The practical skills of management of special children were to be treated when they are placed as special educators in local schools ,colleges and at national Government organizations like NIMH,NIHH at national level and non government organizations at local level like Nava Jeevan center for Visually Challenged, RASS,PASS etc.
21.	HDCW-303 (A)	Organization and Management of Child Welfare Institutions	2017	Students gain knowledge about the organizations striving for child welfare at national and international level. The knowledge helps when students join as supervisors in national schemes like ICDS and at regional level organization like RASS and PASS etc.
22.	HDCW-303(B)	Child and Human Rights	2017	Students gain knowledge about human rights ,child rights and women rights. They canexplains issues faced by women and children in difficult circumstances . The knowledge helps to understand the rights and problems of women and children when they work in Government organizations like Child Protection Officers.

24.	HDCW – 305	Life Skills Education (Theory) + (Practicals)	2021	Students will infer the importance of different life skills to maintain inter – personal and intra – personal communication: They will understand their strengths and weakness and importance of emotional intelligences to cope up with stress and emotions. The skills learnt will help them in their personal and professional and life at local, national and global levels.
27.	HDCW -401	Guidance and Counselling in Human Development	2021	Students gain the knowledge of different approaches to counselling. This will apply counselling skills to practice counselling process. The knowledge helps the students towards employment as counsellors in mental health institutions like VIMHANS ,Vijayawada and local non government organizations like RASS ,PASS ,VIMHANS ,Vijayawada etc.
28.	HDCW -402	Advanced Human Development-II	2021	Students understand the characteristics and problems of early, middle and late adulthood persons. This knowledge helps when they get employment in Day care (or) foster care centers for elderly citizens (or) employment in Govt and ,local old age homes run by non govt organizations like RASS and PASS etc.
29.	HDCW -403(A)	Rehabilitation and Management of Children with Special Needs	2017	Students understand the importance of Rehabilitation of children with developmental challenges through multi disciplinary approach. Gets practical knowledge about functioning of Govt and voluntary organizations that are managing children with developmental challenges .This helps students when they join as special educators at govt organizations like NIMH, Hyderabad and non govt organizations like RASS,PASS.
30.	HDCW -403-B	Gerontology	2021	Students understand the characteristics of old age theories relating to aging and causative factors for problems during old age. This knowledge helps when they establish care centers for elderly as entrepreneurs or work in organization catering to the welfare of elderly like “Karunadamam” run by TTD and Nava Jeevan old age home at local level.
31.	HDCW-404(Practical)			
32.	HDCW-405	Human Resource Management ((Theory) + (Practicals)	2021	Students understand the importance of human resources management and HR management to the organization and employee’s .They apply skills in administering test in selection and recruiting process. The knowledge and skills help in getting employment at both government and non – government sectors.
33.	HDCW 406(A)	Growth and Development During Early Years	2021	Students acquire the knowledge of holistic development of individuals from conception to adolescent period.The students can disseminate the knowledgeto teachersand parents regarding normal and delayed development among children. The students can apply

				skills when they serve as teachers at local level or as extension officers in national schemes like ICDS.
34.	HDCW-406(B)	Disaster Management	2017	Students gain in-depth knowledge about natural disasters; manmade disasters; chemical hazards : disaster management. This helps to understand efforts made by the NGOs, Community based organizations and local administration in disaster management and also to help Government in times of disasters

Extension Management and Communication Technology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	EMCT-101	Communication and Media Preparation (CMP)	2021	The concept of Communication –Recent trends in Instructional technology: Extension literature and the role of different factors influencing and effecting communication process- Dyad setting small group and mass communication. This course will help the students to improve their communication skills.
2	EMCT-102	Extension Education in Community Development (EECD)	2021	The students can gain understanding on the Extension Management community development and panchayat raj system to study the community by using PRA and various approaches of extension education. The students will get jobs as extension officers, and various placements in community development projects, as well as rural co-operative sector.
3	EMCT-103-A	Dynamics of Rural Society(DR)	2021	The students will gain knowledge on social structure; characteristics of rural people; rural social problems - social institutions, learn the factors affecting social change and gain insight about the welfare policies and programmes for rural society.
4	EMCT-103-B	Dynamics of Group Behavior (DGB)	2021	Know about the meaning characteristics, types and functions of groups. Understand the group dynamics and group behavior. Learn the factors affecting group management. Gain insight about the team building, stress and conflict management

5	EMCT-104-A	Community Nutrition(CN)	2021	The students know about nutrients in food and know about the nutritional deficiencies and the community level problems and policies and programmes of Nutrition.
6.	EMCT-104-B	Nutrition during Life Span(NLS)	2021	Gain knowledge on the importance of nutrition during life span. Enlighten the principles and working applications during dietary modifications. Comprehensive knowledge on analysing the nutritional requirements. Apply Computational skills in the Nutritional allowances during life span
7.	EMCT-105	Communication and Media Preparation & Dynamics of Rural Society / Communication and Media Preparation & Dynamics of Group Behavior	2021	Evaluate the Planning, Preparation and use of different teaching aids in teaching different groups of people and in different learning situations. To evaluate the Planning, Preparation and use of different teaching aids in teaching different groups of people and in different learning situations. Gain insight about the welfare policies and programmes for rural society. Gain insight about the team building, stress and conflict management
8.	EMCT -106	Extension Education in Community Development & Community Nutrition / Extension Education in Community Development & Nutrition during Life Span	2021	Acquire skill to study the community by using PRA techniques. Comprehend knowledge on the role of nutrients in different stages of human life and methods of nutritional assessment. Learn the community level problems and policies. Comprehensive knowledge on analysing the nutritional requirements. Apply Computational skills in the Nutritional allowances during life span
9.	EMCT-107	Human Values and Professional Ethics -I (HVPE) *(Audit Course)	2021	Students will apply knowledge of professional ethics and correlate the concepts in addressing the ethical issues outside the class room.
10.	EMCT-201	Community Organization and Leadership (COL)	2021	Students will know about community organization, process of Community organization, rural institutions, leadership, analyze different patterns of leadership; techniques of identification of leaders; steps to organize youth clubs; Role of Panchayat in developing rural women
11	EMCT-202	Entrepreneurial	2021	Students will realize the role of entrepreneurship in economic development. Develop

		Development and Empowerment of Women (ED)		the skill of writing the business proposal and starting of business enterprise
12	EMCT-203-A	Educational Technology(ET)	2021	The students gain knowledge on concept of teaching learning process; forms and levels of teaching and learning; curriculum design, development knowledge on genesis and trends in modern education. This will help the students to develop the curriculum and to choose their career in the teaching field.
13	EMCT-203-B	Technology Transfer and Management (TTM)	2021	Know about Technology meaning and concept, systems of transfer of appropriate technology.Understand the appropriateness of communication media in the system of technology transfer. Analyze the constraints in transfer of technology. Gain insight about the agencies and departments involved in the transfer of technology
14	EMCT-204-A	Research Methodology (RM)	2021	Students get knowledge on ‘variables’, ‘hypothesis’ ,research ‘and recognize the purpose of doing a research, sampling methods and develop a research proposal in the appropriate scientific style.
15	EMCT-204-B	Statistics and Computer Application (SCA)	2021	Get awareness about the scope of statistics in research. Understand the concepts of inferential statistics like t-test, chi-square, Correlation and Variance. Critically apply knowledge of application of statistics in data analysis. Apply skills in using computer applications for data analysis
16	EMCT-205	Community Organization and Leadership& Educational Technology/ Community Organization and Leadership&Technology Transfer and Management	2021	Analyze different patterns of leadership; techniques of identification of leaders; steps to organize youth clubs; Role of Panchayat in developing rural women. Design the criteria for identifying leaders and appraise the ongoing programmes in the locality. Design a course curriculum; Preparation of lesson plans of selected topics. Analyze the constraints in transfer of technology.
17	EMCT-206	Entrepreneurial Development and Empowerment of Women & Research	2021	Realize the role of entrepreneurship in economic development. Analyze the institutional support of entrepreneurship. Critically apply knowledge to select a

		Methodology/ Entrepreneurial Development and Empowerment of Women & Statistics and Computer Application		sample by using different sampling methods like probability and non-probability sampling. Develop a research proposal in the appropriate scientific style. Critically apply knowledge of application of statistics in data analysis. Apply skills in using computer applications for data analysis
18	EMCT-207	Human Values and Professional Ethics –II (HVPE)	2021	Students gain knowledge on ‘value education’ ‘self-introspection’ and ‘self-esteem develop well balanced personality, socially responsible persons of the society.
19	EMCT -301	Managerial Skills for Extension Professionals (MSEP)	2021	Students will know about the conceptualization of management process and its major functions, managerial skill; nature and importance for extension professionals. To understand the concept; scope and relevance of media in society; functions and future prospects of media systems
20	EMCT -302	Training and Development (T&D)	2021	Students will learn the concept of training, goals of training; learning and types of learning, factors affecting learning among adult, current trends in training methodologies; training strategies and designs and acquire skills in developing; selection and use of different training methods- case study; role play; and brain storming; etc. This course will help the students to get jobs as Trainee- motivators, Trainers, consultants etc.
21	EMCT 303-A	Rural Development and Administration (RDA)	2021	Students gain insight about administration in Extension and rural development: coordination and supervision in rural development administration, the purpose and principles of administration; human relation in extension administration the recent ongoing rural development programmes etc. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
22	EMCT 303-B	Principles of Guidance and Counseling (PGC)	2021	Develop knowledge about the concept; purpose; functions and role of guidance; types of services in a guidance programme , counseling and counseling theories, group guidance and counseling; concept; characteristics; Individual v/s group techniques. This course will help the students to get jobs as counselors and in Government and Non-government organizations, as counselors, consultant research co-coordinators etc
23	EMCT -304	Managerial Skills for	2021	Learn creative problem solving techniques; stress management practices; and time

		Extension Professionals & Training and Development		management practices. Develop skills regarding organizational management. Acquire skills in case study; role play; and brain storming; etc. Analyze the roles of a trainer; competencies of trainers; and trainer- trainee perceptions.
24	EMCT – 305	NGO Management (NGOM) (Theory) + (Practicals)	2021	Know about specific knowledge on project and NGO management. Understand the basic concepts and principles involved in managing NGOs. Enhance skills and techniques of Project evaluation / Resource mobilization. Gain insight on project proposal writing and maintenance of records.
25	EMCT-306 –A	Fundamentals of Food, Nutrition and Health (FFNH)	2021	Gain knowledge on foods, food groups, balanced diet for different age groups. Understand the importance of macro and micronutrients in daily diet. Comprehend knowledge on deficiency symptoms of different nutrients. Apply skills to assess nutritional problems in community.
26	EMCT -306-B	Dynamics in Food Preparation (DFP)	2021	Learn the principles of safe food preparation and food pyramid. Understand the role of foods in cookery. Apply knowledge about effect of cooking on nutrients. Able to differentiate different cooking equipments and role of food items in cookery
27	EMCT-401	Communication Technologies in Extension (CTE)	2021	To understand the concept; scope and Communication technologies, relevance of media in society; functions and future prospects of media systems etc.
28	EMCT -402	Participatory Programme Management (PPM)	2021	Students will get knowledge about Programme planning in Extension; Programme Implementation; Programme Evaluation, Documentation, Programme Planning; the Preparation of plan of work ; Purpose, types and tools of Evaluation; Programme planning and implementation, documentation in Programme implementation. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
29	EMCT -403-A	Extension Management (EM)	2021	Students will know about administration and management; process of management and organizational climate, understand the qualities and functions of extension personnel; Problems and issues of extension management in India. Analyze the management skills of extension personnel.
30	EMCT -403-B	Science & Technology for Rural Women (STW)	2021	Students will learn about the Science and Technology for rural development; Energy saving devices-application of solar energy; bio-gas etc., application of Science and Technology in Home science, safe water supply methods suitable for rural areas; health- hygiene and environmental sanitation. ,agencies involved in research and application of Science and Technology.

31	EMCT-404	Communication Technologies in Extension & Participatory Programme Management	2021	Analyze the definite role of advertising in modern marketing system. Evaluate media systems in inter-relation of advertising and mass media systems and types of advertisements. To appraise Programme Evaluation; documentation in Programme implementation. To design and administer a schedule for collection of data : Analysis of data; Develop a Plan of work
32	EMCT-405	Local Government in AP (LGAP) ((Theory) + (Practicals)	2021	Know about local government in Andhra Pradesh. Understand the urban and rural local government, composition, powers and functions. Evaluate committee systems in urban and rural local governments. Assess people's participation in developmental programmes.
33	EMCT 406-A	Growth and Development During Early Years (GDEA)	2021	Know the terms growth , development and stages of development across life span. Understand the characteristics of children at different stages of childhood Explain the different developments like physical, cognitive , language and social development during childhood.Apply knowledge to understand normal development and developmental delays during childhood.
34	EMCT 406-B	Disaster Management (DM)	2021	Students will get an insight about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management., global warming etc)efforts made by the NGOs, & Community based organizations and local administration in disaster management.

Food Technology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	FT 101	Food Chemistry and Analysis	2017	<ul style="list-style-type: none"> - Students will acquire knowledge about physical, chemical, and functional properties of foods. - Learn the fundamental principles and working applications of different analytical techniques associated with food. - Students will be able to explore and perform skills in qualitative and quantitative estimation of nutrients in different foods.
2	FT 102	Cereals, Legumes and	2017	<ul style="list-style-type: none"> - Students will gain knowledge on the structure and composition of cereal grains, pulses and oil seeds.

		Oil seed Technology		<ul style="list-style-type: none"> - Understanding of the basic concepts of Post harvest technology, mechanism of equipments and processing of cereals, pulses and oilseeds - Know about various processing, milling process and evaluate Traditional and commercially processed foods with cereals, pulses and oilseeds
3	FT 103-A	Food Science and Experimental Foods	2017	<ul style="list-style-type: none"> - Students will acquire knowledge on structure, composition and functional properties of plant and Animal foods. - Understand the principles of cookery of different foods and methods of evaluation. - Students will be able to apply the scientific method and quantitative techniques in standardisation of foods using different processing techniques.
4	FT 103-B	Baking Technology	2021	<ul style="list-style-type: none"> - Understanding the General Characteristics, Principles and concept of technology of baking. - To understand the role of different ingredients and methods of processing in baking process - Familiarize with processing techniques of various bakery products and develop skills in organizing and maintenance of a baking industry.
5	FT 104-A	Community Nutrition	2021	<ul style="list-style-type: none"> - Students gain knowledge about nutrients in food and their functions. - Understand the nutritional problems of the community and consequences of deficiency of taking nutrients. - Apply skills for planning diets and techniques to assess the nutritional status of different age groups.
6	FT 104-B	Nutrition during life span	2017	<ul style="list-style-type: none"> - Students gain knowledge on the importance of nutrition and requirements during life span. - Comprehensive knowledge on analysing the nutritional requirements, principles and working applications during dietary modifications. - Evaluate nutrition products for composition, quality, and appropriateness of use and formulate dietary interventions to address nutritional deficiencies.
7	FT 105	101+103-A/103-B Practicals	2017	<ul style="list-style-type: none"> - The students will know about principles and working applications of different analytical techniques associated with food. - Perform skills in qualitative and quantitative estimation of nutrients in different foods. - Comprehensive knowledge on techniques of analysing, evaluating and application of foods in different processing techniques in foods.
8	FT 106	102+104-A/104-B Practicals	2017	<ul style="list-style-type: none"> - The students will be able to explore knowledge on various processing techniques of cereals, legumes and oilseeds. - Students acquire knowledge in various food applications and product preparations. - Understand the consequences of deficiency and menu planning. Knowledge

				about the different methods of nutritional assessment.
9	FT 107:	Human Values and Professional Ethics-I	2017	<ul style="list-style-type: none"> - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. - Values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. - Introducing different concepts of Bhagavad Gita and its applications in uplifting of values in the present society.
10	FT 201	Fruit and Vegetable Technology	2021	<ul style="list-style-type: none"> - Attain an overview on the classification composition and post-harvest handling technologies of fruits and vegetables to reduce postharvest losses and their value addition. - Impart the knowledge of processing, preservation and manufacture of fruits and vegetable based food products of fruits and vegetables. - Expertise in development of various Fruits & vegetables based products and assess the quality of fruit and vegetables and their products.
11	FT 202	Dairy Technology	2017	<ul style="list-style-type: none"> - Impart the knowledge of milk grading , composition and technologies of processing of milk and milk products. - Provide in-depth knowledge in various unit operations and developments in dairy processing. - Demonstrate the manufacturing of various dairy products and exemplify the quality of dairy products.
12	FT 203-A	Food Microbiology and Safety	2017	<ul style="list-style-type: none"> - Obtain knowledge about important genera of microorganisms associated with food and food spoilages. - Understand the various factors associated with growth, food spoilage and food-borne diseases of different microorganisms. - Demonstrate the use of standard methods and procedures for the microbiological analysis of food
13	FT 203-B	Nutrition in Emergencies And Disaster Management	2017	<ul style="list-style-type: none"> - Explain concepts on Epidemiology and its application in planning programs during emergencies and emergency situations in natural and manmade disasters. - Gain knowledge on nutrition surveillance and treatment in emergencies. - Knowledge on planning nutrition relief and rehabilitation in emergencies.
14	FT 204-A	Research Methodology	2017	<ul style="list-style-type: none"> - Awareness about terms like ‘variables’, ‘hypothesis’, research ‘and recognize the purpose of doing research. - Understand different types of research like experimental, survey, applied,

				<p>action research etc., and differentiate advantages and disadvantages each type of research.</p> <ul style="list-style-type: none"> - Critically apply knowledge to select a sample by using different sampling methods like probability and non-probability sampling and development of research proposal.
15	FT 204-B	Statistics and Computer Applications	2021	<ul style="list-style-type: none"> - Students familiarise the terms like ‘frequency distribution’, ‘Variance’ , ‘Correlation’ and its scope in research data - Understand different types of statistics that are used in research data. - Critically know the calculations of different statistics of research data and computer applications.
16	FT 205	201+203-A/203-B Practicals	2017	<ul style="list-style-type: none"> - Student will know about various fruit and vegetable processing techniques and attain practical knowledge in production and preparation of products. - Acquire knowledge on laboratory techniques to identify microorganisms in food. - To know the concepts on Epidemiology and its application in planning programs during emergencies.
17	FT 206	202+204-A/204-B Practicals	2017	<ul style="list-style-type: none"> - Students acquire knowledge of grading, composition, quality evaluation and processing techniques of milk and milk products. - Critically know the research procedures for identifying an ideal sample for scientific research and able to prepare a research proposal in the appropriate scientific style . - Students gain knowledge and understand the concepts of inferential statistics like t-test, chi-square, Correlation and Variance of application of statistics in data analysis.
18	FT 207	Human Values and Professional Ethics-II	2017	<ul style="list-style-type: none"> - Student will know the values of ethics in various fields including medical, social and business ethics. - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. - Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
19	FT 301	Food Processing and Preservation Technology	2017	<ul style="list-style-type: none"> - Students able to understand the scope, principles and different methods of processing and preservation techniques. - Acquire knowledge of emerging technologies and their applications in food processing and preservation. - Understand the applications and limitations of food processing and preservation technology.

20	FT 302	Live stock and Sea Food Technology	2017	<ul style="list-style-type: none"> - Acquire knowledge of the structure, composition, nutritional quality of various, livestock and seafood. - Gain insight knowledge of slaughtering, carcass processing, processing methods used for processing meat poultry and fish. - Prepare various value-added products of egg, meat, poultry and sea foods.
21	FT 303-A	Technology of Spices, Condiments and Plantation crops	2017	<ul style="list-style-type: none"> - Students acquire knowledge, identification and post-harvest technologies of various spices, condiments and plantation crops. - Illustrate various value added products of spices, condiments and plantation crops. - Perceive Standards, specifications, packaging and Quality control measures of spices, condiments and plantation crops.
22	FT 303-B	Basics of Food Engineering	2017	<ul style="list-style-type: none"> - Student understands the basic Principles, overview of processing techniques and methods of food. - Able to describe the types and properties of agro processing equipments like pasteurizer, spray drier and sealing equipments. - Enumerate processing equipments and maintenance of processing equipments
23	FT 304	301+302 Practicals	2017	<ul style="list-style-type: none"> - Student acquires knowledge of emerging technologies and their applications in various processing techniques and products of various foods by processing and preservation methods. - Understand the grades, structure, composition, processing and nutritional quality of various livestock and seafood products.
24	FT 305	Food Industry Management (T) +(Practicals)	2021	<ul style="list-style-type: none"> - Provide hands on experience with regard to different areas in food industries. - Acquaint and gain knowledge related to production, unit operations, quality control and marketing aspects of food industry. - Emphasize the prominence of food plant sanitation, food safety, standards, laws and regulation in food industry.
25	FT 306-A	Fundamentals of Food, Nutrition and Health	2017	<ul style="list-style-type: none"> - Gain knowledge on foods, food groups, balanced diet and importance of macro and micronutrients for different age groups in daily diet. - Comprehend knowledge on deficiency symptoms of different nutrients. - Apply skills to assess on nutritional problems in community.
26	FT 306-B	Dynamics in Food Preparation	2021	<ul style="list-style-type: none"> - Gain knowledge on principles of safe food preparation and cooking methods and effect of cooking on nutrients. - Apply knowledge about effect of cooking on nutrients. - Able to differentiate different cooking equipment and role of different food items in cookery.

27	FT 401	Food Safety Standards and Quality Control	2017	<ul style="list-style-type: none"> - Gain knowledge in current rules and regulations of food safety standards and quality assurance. - Understand the insight quality evaluation of different foods by standard methods. - Develop skills for quality analysis and assurance of food quality.
28	FT 402	Food Product Development and Marketing	2017	<ul style="list-style-type: none"> - Elucidate the process of new food product development process to generate ideas, develop concept to test market and in food industry. - Acquire the skill to design and development of new food product and analyse the quality of the product. - Student able to design, demonstrate the skills in food process, organoleptic evaluation and nutritional label of food products as a team work.
29	FT 403-A	Nutrition for Health and Fitness	2017	<ul style="list-style-type: none"> - Understand the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation. - Describe the role of nutrients in physical performance, weight management, obesity and Energy metabolism pathways during physical activity. - Gain knowledge on concepts of physical activity, physical fitness and the importance of nutrients in Sports.
30	FT 403-B	Unit Operations in Food Industry	2017	<ul style="list-style-type: none"> - Important preliminary operations in food processing industries and understand the principle of Unit operation in food industry. - Impart knowledge on Safety, sanitation and Effluent Treatment in food industry. - Know the different pre and post processing operations as storage and packaging foods etc.
31	FT 404	401+402 Practicals	2017	<ul style="list-style-type: none"> - Gain knowledge on subjective and objective evaluation methods of foods with safety and standards. - Exemplify various speciality food products and their applications, acquire the skill to design and development of new food product and analyse the quality of the product.
32	FT 405	Technology of Packaging (T+P)	2021	<ul style="list-style-type: none"> - Enable the students to understand the regulations of packaging and packaging material testing. - Knowledge of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life. - Able to utilize some of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life
33	FT 406-A	Child Welfare Programmes	2017	<ul style="list-style-type: none"> - Understand the different developments like physical, cognitive, language and social development during childhood. - Apply knowledge to understand normal development and developmental delays during childhood.

34	FT 406-B	Disaster Management	2017	<ul style="list-style-type: none">- Understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters;- Illustrate the efforts made by the NGOs, Community based organizations and local administration in disaster management.
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37. Mathematics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1. 1	MA 101	Algebra	2021	<ol style="list-style-type: none"> 1. Identify the concept of action and conjugation. 2. Explain the applications of Sylow's theorems 3. Understand homomorphism and ideals in Rings. 4. Understand U.F.D, E.D and Polynomial Rings
2.	MA 102	Real analysis	2021	<ol style="list-style-type: none"> 1. Understand the concepts of Riemann Stieltjes integration and Differentiation. 2. Understand Uniform Convergence and continuity. 3. Learn comparison tests at a and infinity. 4. Analyze the concept of functions of several variables.
3.	MA 103A	Ordinary Differential equations	2021	<ol style="list-style-type: none"> 1. Learn boundary value problems, Eigen values and Eigen functions 2. Solve the second order linear questions. 3. Apply knowledge on special functions of Mathematical Physics. 4. Understand the method of successive approximation and solve the problems related to Picard's theorem
4.	MA 103 B	Linear Algebra	2021	<p>Solve the system of linear equations</p> <p>Understand the concept of vector space, basis and</p>

				<p>dimension. Analyze the linear Transformation</p> <p>3. Explain the direct sum decompositions</p> <p>4. Understand the Bilinear forms.</p>
5.	MA 104A	Numerical Methods	2021	<p>Solve Algebraic and Transcendental polynomial equations.</p> <p>2. Understand Interpolation, Differentiation, Integration, the solution of Differential Equations</p> <p>3. Solving the direct methods, matrix inversion methods and iterative method...etc.</p> <p>4. Analyze and evaluate the accuracy of common Numerical methods.</p>
6.	MA 104B	Lattice theory	2021	<p>Know Partly Ordered Sets.</p> <p>2. Understand Lattices as Algebraic structures</p> <p>3. study complete Lattices.</p> <p>4. Compare the distributive and modular lattices</p>
7.	MA 105	Complex Analysis	2021	<p>1. Decide when and where a given function is analytic and be able to find its series development</p> <p>2. Describe conformal mappings between various plane regions</p> <p>3. Describe basic properties of complex integration and having the ability to compute such integrals.</p> <p>4. Understand Power series and expansion of analytic function.</p>
8.	MA 106	Discrete Mathematics	2021	<p>1. Use standard Normal Forms-Disjunctive-Conjunctive Principal Disjunctive</p> <p>2. Understand Inference Theory of the</p>

				<p>Predicate Calculus</p> <ol style="list-style-type: none"> Understand Lattices and Boolean Functions. Understand basic concepts of graph theory.
9.	MA 201	Galois Theory	2021	<ol style="list-style-type: none"> Apply the knowledge on polynomials solvable by radicals, Extension field. Understand the Explain the normal and separable extensions and concepts such as extension fields and splitting fields Study the roots of polynomials speciallyquintic polynomials which is the cause to develop Galois theory. Solve the problems on cyclotomic polynomials.
10.	MA 202	Partial Differential Equations	2021	<p>Analyze the origin of first order PDEs and Integral surfaces passing through a given curve</p> <ol style="list-style-type: none"> Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method. Solve the various, methods on Partial Differential Equations of the Second order. Obtain equipotential surfaces using Laplace's equation.
11.	MA 203A	Topology	2021	<ol style="list-style-type: none"> Understand to construct topological spaces from metric spaces and using general properties of neighborhoods, open sets, closed sets, basic and sub-basis. Understand Topological Spaces, definition & examples.

				<ol style="list-style-type: none"> 3. They know what we mean by connectedness, compactness, and hausdorf property and their general characteristics. 4. Understand the Countability axioms, the separation axioms and normal spaces. And also the classical theorems such as the Uryshon lemma, the Tietze extension theorem.
12.	MA 203B	Semi group Theory	2021	<ol style="list-style-type: none"> 1. Discuss semi groups with the properties. 2. Explain The structure of D.Classes – regular semigrups. 3. Obtain proofs of Rees’s Theorem and Primitive idempotents. 4. Know the congruences on completely O-Simple semi groups
13.	MA 204A	Advanced Complex Analysis	2021	<ol style="list-style-type: none"> 1. To learn Laurent Series-Singular Points. 2. Explain the basic properties of complex integration and compute such integrals. 3. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions. 4. Understand the Infinite product and Partial Fraction Expansions.
14.	MA 204B	Nonlinear Analysis	2021	<ol style="list-style-type: none"> 1) Explain fixed point theory and its applications by well known theorems. 2) Analyse the approximations in Normed spaces, strict convexity – uniform, Chebyshev polyamines, Hilbert space , splines. 3) Use of complex analysis in spectral theory, Banach algebras 4) Evaluation of spectral theory in normed spaces, finite dimensional normed spaces.

15.	MA 205	Measure and Integration	2021	<p>Compute Lebesgue measures.</p> <p>2. Compute Lebesgue integrals of bounded functions over a set of finite measure</p> <p>3. Solving the Differentiation and Integration of Monotone functions.</p> <p>4. Understand the L^p Spaces, The MinKowski and Holder inequalities, Convergence and completeness</p>
16.	MA 206	Mathematical Statistics	2021	<p>To learn the fundamental concepts of statistics and techniques required for data analysis.</p> <p>2. Apply the knowledge of Binomial, Poisson, Gamma, chi-square, normal distribution in solving various problems,.</p> <p>2. To explain stochastic convergence</p> <p>3. To discuss measures of quantity of estimations</p>
17.	MA 301	Commutative Algebra	2021	<p>To understand the ideals, Modules and operations on them.</p> <p>2. To learn the structures of composition series with ACC and DCC</p> <p>2. To study the theoretical properties of Noetherian rings</p> <p>3. Explain decomposition theorem and applications.</p>

				5. To develop applications in the different fields.
18.	MA 302	Functional Analysis	2021	<ol style="list-style-type: none"> 1) They can work with different distance metrics and normed spaces. 2) Understand continuous linear transformations and the Hahn-Banach Theorem. 3) Comprehend the Open mapping theorem and Closed graph theorem. 4) Construct orthonormal sets and conjugate spaces. 5) Understand the relevance of self-adjoint operators, normal, unitary operators and projections. <p>Comprehend the ideas of determinants and the spectrum of an operator</p>
19.	MA 303 A	Differential Geometry	2021	<p>define space curves , curvature and torsion of a curve.</p> <ol style="list-style-type: none"> 2. Parameterize surfaces and use the metric tensor. Calculate isometries. 3. treat geodesic curves and parallel translation . 4. calculate and analyse curvature of surfaces in different settings. s5. know the concept of tensor and recognize tensors that are used in mechanics , <p>Image processing and theory of relativity.</p>
20.	MA 303 B	Algebraic coding theory	2021	Analyse Error detecting and error correcting codes.

				<p>2. Understand and apply algorithms in applications like sending messages without errors.</p> <p>3. Use bounds for different types of codes.</p> <p>4. Understand the polynomial encoding and decoding.</p>
21.	MA 304	Classical Mechanics	2021	<ol style="list-style-type: none"> 1) Understand D' Alembert's Principle and simple applications of the Lagrangian Formulation. 2) Derive the Lagrange's Equation from Hamilton's Principle. 3) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems. 4) Distinguish the concept of the Hamilton Equations of Motion and the Principle of Least Action. 5) Get familiar with canonical transformations, conditions of cononicity of a transformation in terms of Lagrange and Poisson brackets.
22.	MA 305	MAT-LAB	2021	<p>.Understand the mathematical operations & functions.</p> <p>2. Write a program to addition & multiplication matrices.</p> <p>3. Understand the 2-D plotting and 3-D plotting techniques.</p> <p>4. Solve algebraic and transcendental equations.</p>
23.	MA 306A	Business Mathematics	2021	<ol style="list-style-type: none"> 1. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems. 2. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and

				<p>business.</p> <ol style="list-style-type: none"> 3. Explain the concepts and use equations, formulae and mathematical expressions and relationships in a variety of contexts 4. Understand The Binary Octal , Octal, Decimal and Hexadecimal Systems.
24.	MA 306B	Fundamentals of Mathematical Statistics	2021	<ol style="list-style-type: none"> 1. To learn the fundamental concepts of statistics and correlation analysis 2. To analyse regression lines. 3. To explain tests of significance 4. To solve liner equations by matrix methods
25.	MA 401	Number Theory	2021	<ol style="list-style-type: none"> 1. Understand arithmetical Functions. 2. Use functions $\Phi(n)$, $\Pi(n)$, $J(n)$. 3. Understand the definitions of congruences, residue classes and least residues 4. Apply legendary polynomial and application of reciprocity law.
26.	MA 402	Banach Algebra	2021	<ol style="list-style-type: none"> 1. Understand different types of Banach Algebras with examples. 2. Know the essence of Gelfand mapping 3. Understand the Application of Commutative C^*- algebras. 4. Derive the applications of Banach Algebra in analysis, Fourier series, Boolean Algebras and other significant areas of mathematics.

27.	MA 403A	Graph Theory	2021	<p>Able to define basic concepts of graphs</p> <p>2. Utilize the Algorithms to find the shortest path, Optimal tree from a given graph.</p> <p>3. construct reliable communication network.</p> <p>4. Understand the concepts of practical problems like Chinese postman problem and travelling salesman problem</p>
28.	MA 403B	Approximation Theory	2021	<p>1) Know the Basic concepts of Metric spaces And Normed Linear space.</p> <p>2) Knows existence and uniqueness theorems for the best approximations in various Banach spaces.</p> <p>3) Knows Bernstein's lethargy theorem and its practical and theoretical implications.</p> <p>4) Be able to use and analyze the basic methods for polynomial approximations.</p>
29.	MA 404	Operations Research for Industry and Community Development	2021	<p>1) Formulate some real life problems into Linear Programming Problems.</p> <p>2) Understand Dynamic Programming.</p> <p>3) Solve the problems of Game with pure Strategies and Mixed Strategies.</p> <p>4) Construct Reliable Networks.</p>
30.	MA 405	Computer Oriented Numerical Methods	2021	<p>1. Gain Knowledge in C-Language</p> <p>2. Able to use commands and operations of C.</p> <p>3. Solve integration and ODE problems by numerical methods</p> <p>4. Write the programming to solve problems in numerical methods.</p>

31.	MA 406A	Business Mathematics-II	2021	<ul style="list-style-type: none"> • Able to solve problems on Time and work, Distance • Understand the mixtures and also learn to calculate the Simple interest and compound interest. • Find roots of Algebraic equations and sum and terms of given series. • Analyse the data from charts and graphs..
32.	MA 406B	Mathematics for Social Sciences	2021	<ol style="list-style-type: none"> 1. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 2. Understand the concepts of Limit, continuity & differentiation of functions. 3. Apply Integrals to find areas, length & volume of regions. 4. Apply the numerical Techniques to solve differential equations & Algebraic equations.

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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Applied Mathematics

1.	AMA 101	Methods of Applied Mathematics	2021	<p>Expand a function in a Fourier series and able to know under what conditions such an expansion is valid.</p> <p>2. Aware of the connection between integral transforms (Fourier and Laplace) and be able to use the latter to solve mathematical problems relevant to the physical sciences.</p> <p>3. Understand the applications of Sylow theorems.</p> <p>4. Describe Unique Factorization and Euclidean Domains</p>
2.	AMA 102	Real Analysis	2021	<p>Understand the concepts of Riemann Integration and Differentiation.</p> <p>2. To learn the different types of Sequences and Series of Functions, Equicontinuous Families of Functions.</p> <p>3. Understand Uniform Convergence and continuity.</p> <p>4. Apply the Stone-Weierstrass theorem.</p>
3.	AMA 103A	Ordinary Differential Equations	2021	<ol style="list-style-type: none"> 1. Recognize and classify O.D.Es. 2. Learn boundary value problems, Eigen values and Eigen functions 3. Apply knowledge on special functions of Mathematical Physics. 4. Understand the method of successive approximation and solve the second order linear questions. 5. Solve the problems related to Picard's theorem 6. Identify research problems where D.Es can be used . 7. Analyse engineering problems like series/ parallel circuits etc using 1st and 2nd order O.D.Es.

4.	AMA 103B	Viscous Flows	2021	<p>Employ Bernoulli's equation for real flow and deduce expressions for orifice meter and Venturimeter.</p> <p>2. Establish Hagen Poiseuille's equation for laminar flow through pipe and parallel plates.</p> <p>3. The course provides the student with knowledge about: - Formulating and solving problems in fluid mechanics where viscosity and heat conductivity are of importance, in particular at high Reynolds numbers where the boundary layer approximation applies. - Primary focus is on the laminar flow regime. Briefly about stability and transition to turbulence. - Quantitative methods for classical cases, such as Stokes problems, stagnation point flow, Blasius and Falkner-Skan problems, and integral methods for other boundary layers with pressure gradient and possible separation</p>
5.	AMA 104A	Numerical Methods	2021	<p>solve Algebraic and Transcendental polynomial equations.</p> <p>2.Learn how to apply the Numerical method for various Mathematical operations and tasks.</p> <p>3.Understand Interpolation,Differentiation,Integration,the solution of Differential Equations</p> <p>4.Analyse and evaluate the accuracy of common Numerical methods.</p>
6.	AMA 104 B	Boundary Value Problems	2021	<p>. Use the knowledge of Legendre and Chebyshev polynomials.</p> <p>2. Apply Fourier and Hankel transforms in engineering problems.</p> <p>3. Solve boundary value problems.</p> <p>4. Understand the probability theory.</p>

7.	AMA 105	Complex Analysis	2021	<ol style="list-style-type: none"> 1. Identify curves and regions in the complex plane defined by simple expressions. 2. Describe basic properties of complex integration and having the ability to compute such integrals. 3. Decide when and where a given function is analytic and be able to find it series development. 4. Describe conformal mappings between various plane regions. 5. Apply the concepts of Complex Analysis in many branches of mathematics, including algebraic geometry, number theory, analytic combinatorics, applied mathematics; as well as in physics, including the branches of hydrodynamics, thermodynamics and particularly quantum mechanics.
8.	AMA 106	Discrete Mathematics	2021	<ol style="list-style-type: none"> 1. Use standard notations of propositional logic. 2. Understand the truth tables for expressions involving negation, conjunction, and disjunction 3. Determine if a logical argument is valid or invalid. <p>Find concepts and notations from discrete mathematics are useful in studying Automata theory ,Number theory and mathematical cryptography</p>

9.	AMA 201	Mathematical Modeling	2021	<ol style="list-style-type: none"> 1) Understand what a mathematical model is and explain the series of steps involved in a mathematical modeling process. 2) Identify some simple real-life problems that can be solved using mathematical models, model the problem, solve the resulting problem, and interpret the solution. 3) Acquire basic mathematical modeling skills that will enable them carry out simple modeling tasks individually or as a group. 4) State and explain the different classifications of mathematical models stating examples in each class. 5) Analyze the importance of partial differential equations in mathematical modeling. 6) Frame quantitative problems and model them mathematically.
10.	AMA 202	Partial Differential Equations	2021	<ol style="list-style-type: none"> 1. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method. 2. Apply Variables separable methods to solve Laplace Equation in cylindrical or spherical coordinates. 3. Obtain equipotential surfaces using Laplace's equation. 4. Understand the importance of partial differential equations in geometry, physics and other subjects.
11.	AMA 203A	Topology	2021	<ol style="list-style-type: none"> 1. Understand to construct topological spaces from metric spaces and using general properties of neighbourhoods, open sets,

				<p>closed sets, basic and sub-basis.</p> <ol style="list-style-type: none"> 2. Apply the properties of open sets, closed sets, interior points, accumulation points and derived sets in deriving the proofs of various theorems. 3. To understand the concepts of countable spaces and separable spaces. 4. They know what we mean by connectedness, compactness, and hausdorff property and their general characteristics. 5. Understand the Countability axioms, the separation axioms and normal spaces. <p>Understand the classical theorems such as the Uryshon lemma, the Tietze extension theorem</p>
12.	AMA 203B	Magneto Hydro Dynamics	2021	<p>Understanding the basic concepts and the equations of flow of viscous fluids. Understanding the electromagnetic induction mechanism which has its origin in the movement of fluids that are good electrical conductors</p> <ol style="list-style-type: none"> 2. Ability to translate a magnetic hydrodynamic problem in an appropriate mathematical form. 3. Ability to interpret the solutions of the equations established in physical terms.
13.	AMA 204A	Advanced Complex Analysis	2021	<ol style="list-style-type: none"> 1. Explain the basic properties of complex integration and compute such integrals. 2. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions. 3. Apply advanced techniques to evaluate definite integrals and differential equations in applied areas. 4. Explain general principles of conformal mapping. 5. Compute the residue of a function and use the Residue Theory to evaluate a contour

				integral or an integral over the real line
14.	AMA 204B	Nonlinear Analysis	2021	<ol style="list-style-type: none"> 1) Explain fixed point theory and its applications by well known theorems. 2) Analyse the approximations in Normed spaces, strict convexity – uniform, Chebyshev polyamines, Hilbert space , splines. 3) Evaluation of spectral theory in normed spaces, finite dimensional normed spaces. 4) Spectral properties of boundary linear operator, compact linear operator, Resolvent and spectrum. 5) Use of complex analysis in spectral theory, Banach algebras.
15.	AMA 205	Measure and Integration	2021	<p>Compute Lebesgue measures.</p> <ol style="list-style-type: none"> 2. Establish the measurability or non-measurability of sets and functions. 3. Approximate measurable functions by simple and step functions. 4 .Compute Lebesgue integrals of bounded functions over a set of finite measure. <p>Explain Fourier analysis.</p> <p>5.Decide under which conditions the fundamental theorem of calculus is applicable in the context of Lebesgue integration.</p>
16.	AMA 206	Mathematical Statistics	2021	To learn the fundamental concepts of statistics and techniques required for data analysis.

				<p>2. To explain stochastic convergence</p> <p>3. To discuss measures of quantity of estimations</p> <p>4. Study confidence intervals of variances.</p> <p>5. Understand Rao-Blackwell theorem and Rao Cramer's inequality</p> <p>6. Able to analyze the data of practical problems.</p>
17.	AMA 301	Continuum Mechanics	2021	<p>1) Be able to describe motion, deformation and forces in a continuum.</p> <p>2) Be able to derive equations of motion and conservation laws for a continuum.</p> <p>3) Understand constitutive models for fluids and viscoelastic solids.</p> <p>4) Formulate and solve specific technical problems of displacement, strain and stress.</p> <p>5) Perform experiments with stresses and deformations.</p> <p>Numerically model and analyse the stresses and deformations of simple geometries under an arbitrary load in both solids and liquids</p>
18.	AMA 302	Functional Analysis	2021	<p>1) They can work with different distance metrics and normed spaces.</p> <p>2) Understand continuous linear transformations and the Hahn-Banach Theorem.</p> <p>3) Comprehend the Open mapping theorem and Closed graph theorem.</p> <p>4) Construct orthonormal sets and conjugate spaces.</p> <p>5) Understand the relevance of self-adjoint operators, normal, unitary operators and projections.</p> <p>6) Comprehend the ideas of determinants and the spectrum of an operator.</p>

19.	AMA 303A	Differential Geometry	2021	<ol style="list-style-type: none"> 1. Determine and calculate curvature of curves in different coordinate systems. 2. Parameterize surfaces and use the metric tensor. Calculate isometries. 3. Treat geodesic curves and parallel translation. 4. Calculate and analyse curvature of surfaces in different settings. 5. Know the concept of tensor and recognize tensors that are used in mechanics, image processing and theory of relativity.
20.	AMA 303 B	Mathematical Methods	2021	<p>Knows and can use: a) concepts, results and methods from real analysis of single-variable functions related to limits, continuity, differentiation, integration and differential equations. b) concepts, results and methods related to systems of linear equations. c) numerical methods for solving equations, integrals and differential equations.</p> <p>2.Knows some engineering applications of mathematics.</p>
21.	AMA 304	Classical Mechanics	2021	<ol style="list-style-type: none"> 1) Understand D' Alembert's Principle and simple applications of the Lagrangian Formulation. 2) Derive the Lagrange's Equation from Hamilton's Principle. 3) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems. 4) Distinguish the concept of the Hamilton Equations of Motion and

				<p>the Principle of Least Action.</p> <p>5) Get familiar with canonical transformations, conditions of cononicity of a transformation in terms of Lagrange and Poisson brackets.</p>
22.	AMA 305	MAT-LAB	2021	<p>Understand the mathematical operations & functions.</p> <p>2. Write a program to addition & multiplication matrices.</p> <p>3. Understand the 2-D plotting and 3-D plotting techniques.</p> <p>4. Solve algebraic and transcendental equations.</p>
23.	AMA 306A	Business Mathematics-I	2021	<ol style="list-style-type: none"> 1. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems. 2. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and business 3. Explain the Concepts and use Equations, formulae and Mathematical expressions and in a variety of contexts. 4. Understand the Binary ,octal , decimal and hexadecimal system.
24.	AMA 401	Number Theory	2021	<ol style="list-style-type: none"> 1. the Arith Understand metical Functions. 2. Use $\Phi(n)$, $\Pi(n)$, $\mathcal{J}(n)$. 3. Understand the definitions of congruences, residue classes and least residues 4. Apply legendary polynomial and application of reciprocity law.

25.	AMA 402	Fluid Dynamics	2021	<ol style="list-style-type: none"> 1) Be familiar with continuum model of fluid flow and classify fluid/flows based on physical properties of a fluid/flow along with Eulerian and Lagrangian descriptions of fluid motion. 2) Derive and solve equation of continuity, equations of motion, vorticity equation, equation of moving boundary surface, pressure equation and equation of impulsive action for a moving inviscid fluid. 3) Understand Boundary layer Equations. <p>Solve Analytic Boundary layer equations</p>
26.	AMA 403A	Graph Theory	2021	<p>Able to define basic concepts of graphs</p> <ol style="list-style-type: none"> 2. Utilize the algorithms to find the shortest path, Optimal tree from a given graph 3 . Construct the Reliable Communication networks 4. Understand the concepts of practical problems like Chinese postman problem and travelling salesman problem.
27.	AMA 403B	Approximation Theory	2021	<ol style="list-style-type: none"> 1) Know the basic concepts of metric space and normed linear space 2) Knows existence and uniqueness theorems for the best approximations in various Banach spaces. 3) Knows Bernstein's lethargy theorem and its practical and theoretical implications. 4) Be able to use and analyze the basic methods

				for polynomial approximations, interpolation.
28.	AMA 404	Operations Research for Industry and Community Development	2021	<ol style="list-style-type: none"> 1) Formulate some real life problems into Linear Programming Problem. 2) Solve linear programming problem by using algebraic graphical method. 3) Use the simplex method to find an optimal vector for the standard linear programming problem and the corresponding dual problem. 4) Prove the optimality condition for feasible vectors for Linear Programming Problem and Dual Linear Programming Problem. 5) Use operations research to solve transportation problems during the allocation of trucks to the formulate operation research models to solve real life problem. 6) Understand Queuing theory basic concepts and solve queuing theory problems. 7) Deterministic inventory models, static economic, classic EOQ models.
29.	AMA 405	Computer Oriented Numerical Methods	2021	<p>Gain Knowledge in C-Language</p> <ol style="list-style-type: none"> 2. Able to use commands operations of C. 3. Write the programming to solve problems in numerical methods.
30.	AMA 406A	Business Mathematics-II	2021	<ol style="list-style-type: none"> 1. Able to solve problems on Time and work, Distance 2. Understand the mixtures

				<ol style="list-style-type: none"> 3. Calculate the Simple interest and compound interest. 4. Analyse the data from charts and graphs.
31.	AMA 406B	Mathematics for Social Sciences	2021	<ol style="list-style-type: none"> 1. Understand the concepts of vector spaces with bases. 2. Discuss algebra of Transformations and orthogonal components. 3. Understand the concepts of Limit, continuity & differentiation of functions. 4. Apply Integrals to find areas, length & volume of regions. 5. Apply the numerical Techniques to solve differential equations & Algebraic equations.

38. Microbiology

Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
MB-101	Introductory Microbiology	2021	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
MB-102	Microbial Physiology	2021	Be able to know about the nutrition and microbial growth. Be able to know about photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration. Be able to know in depth about various pathways in protein and nucleotide metabolisms
MB-103	Bio chemistry	2021	Through this course the students are exposed to importance of biological macromolecules. They acquire knowledge in the quantitative and qualitative estimation of biomolecules.

			They study the influence and role of structure in reactivity of biomolecules. At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions
MB 104	Biophysics and biostatistics	2021	This course imparts the knowledge of basic statistical methods to solve problems Students are taught to operate various statistical software packages. By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research Be able to gain knowledge on basic concepts in statistics.
MB-201	Molecular Biology	2021	The course teaches the students about genes at molecular level. They learn about DNA, RNA and their replication, mutations, DNA repair mechanism. The course outcome is to train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy
MB-202	Recombinant DNA technology	2021	This course teaches RDNA technology techniques and their application in the field of genetic engineering. They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries. Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering.
MB 302	b) Bioprocessing of Industrial Microorganisms	2021	Give elaborate knowledge on Health care products. Provide in depth knowledge about microbial antibodies and recombinant products. Provide detailed knowledge about organic acids and enzymes. Gives in depth knowledge on oxidative transformation.
MB-303	a) Pharmaceutical Microbiology	2021	This is an interdisciplinary course that covers the aspects involved in understanding the pharmacokinetics and drug metabolism involving nano-based drug delivery system. The students learn about various pharmacokinetics parameters through mathematical models, design protocol for BA/BE study and its interpretation, design invitro dissolution studies for various drugs. At the end of the course, the students will have the necessary knowledge in the area in pharmacokinetics.
MB-303	b) Down stream processing	2021	The course introduces the analytical methods used in separation science . They learn about various analytical techniques that are routinely used for separation of biomolecules and their components. The course teaches students the advantages of separation science as applied to biotechnology

MB-306 a	Computational biology	2021	This allied paper introduces the students to concepts in bioinformatics. The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems
MB-402	Industrial based Microbial clean technology	2021	Microbial cleaning takes advantage of naturally-occurring microbes to remove a wide variety of contaminants from various surfaces. The method is based on the affinity of microbes for hydrocarbons that are digested, producing harmless carbon dioxide, water, and soluble fatty acids. The microbes are nonpathogenic and are safe to handle and dispose. The process is environmentally-friendly and is less expensive than solvent cleaning, but it is not applicable to high precision cleaning applications. Typical applications include parts washing; oil and grease removal from concrete and other floor surfaces, and from drains and grease traps; cleaning and disinfection in healthcare facilities. Able to design procedures, record research methodology and interpret the research
MB-403	a) Industrial production of Microbial product	2021	Microbes are the major components of biological system on this earth. They are present everywhere, even at sites where no other life could possibly exist. Many microbes are useful to human beings. We use microbes and microbial derived products almost every day like curd and other fermented foods like idli, dosa, bread, etc. Microbes are also used in most of the industries. Alcohol, antibiotics, vinegar, etc are important microbial products. Microbes are very helpful in sewage treatment, biogas production and preparation of biofertilizers as well. So it's clear from this chapter that microbes play a very important role in welfare of human society.
	b) Industrial Microbial technology	2021	Students in this course will learn about microbes in food, spoilage of food and preservation techniques of food. Through this course, they also learn about microbiology of milk, fermented dairy products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms. At the end of the course, the student will be able to use the preservation techniques for food and use this experience to be employed as quality control experts.

Industrial Microbiology

Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
IMB-101	Introductory Microbiology	2021	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural

			similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
IMB-102	Microbial Physiology	2021	Be able to know about the nutrition and microbial growth. Be able to know about photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration. Be able to know in depth about various pathways in protein and nucleotide metabolisms
IMB-103	Bio chemistry	2021	Through this course the students are exposed to importance of biological macromolecules. They acquire knowledge in the quantitative and qualitative estimation of biomolecules. They study the influence and role of structure in reactivity of biomolecules. At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions
IMB 104	Biophysics and biostatistics	2021	This course imparts the knowledge of basic statistical methods to solve problems Students are taught to operate various statistical software packages. By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research Be able to gain knowledge on basic concepts in statistics.
IMB-201	Molecular Biology	2021	The course teaches the students about genes at molecular level. They learn about DNA, RNA and their replication, mutations, DNA repair mechanism. The course outcome is to train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy
IMB-202	Recombinant DNA technology	2021	This course teaches RDNA technology techniques and their application in the field of genetic engineering. They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries. Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering.
IMB 302	b) Bioprocessing of Industrial Microorganisms	2021	Give elaborate knowledge on Health care products. Provide in depth knowledge about microbial antibodies and recombinant products. Provide detailed knowledge about organic acids and enzymes. Gives in depth knowledge on oxidative transformation.
IMB-303	a) Pharmaceutical Microbiology	2021	This is an interdisciplinary course that covers the aspects involved in understanding the pharmacokinetics and drug metabolism involving nano-based drug delivery system. The students learn about various pharmacokinetics parameters through mathematical models, design

			protocol for BA/BE study and its interpretation, design invitro dissolution studies for various drugs. At the end of the course, the students will have the necessary knowledge in the area in pharmacokinetics.
IMB-303	b) Down stream processing	2021	The course introduces the analytical methods used in separation science . They learn about various analytical techniques that are routinely used for separation of biomolecules and their components. The course teaches students the advantages of separation science as applied to biotechnology
IMB-306 a	Computational biology	2021	This allied paper introduces the students to concepts in bioinformatics. The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems
IMB-402	Industrial based Microbial clean technology	2021	Microbial cleaning takes advantage of naturally-occurring microbes to remove a wide variety of contaminants from various surfaces. The method is based on the affinity of microbes for hydrocarbons that are digested, producing harmless carbon dioxide, water, and soluble fatty acids. The microbes are nonpathogenic and are safe to handle and dispose. The process is environmentally-friendly and is less expensive than solvent cleaning, but it is not applicable to high precision cleaning applications. Typical applications include parts washing; oil and grease removal from concrete and other floor surfaces, and from drains and grease traps; cleaning and disinfection in healthcare facilities. Able to design procedures, record research methodology and interpret the research
IMB-403	a) Industrial production of Microbial product	2021	Microbes are the major components of biological system on this earth. They are present everywhere, even at sites where no other life could possibly exist. Many microbes are useful to human beings. We use microbes and microbial derived products almost every day like curd and other fermented foods like idli, dosa, bread, etc. Microbes are also used in most of the industries. Alcohol, antibiotics, vinegar, etc are important microbial products. Microbes are very helpful in sewage treatment, biogas production and preparation of biofertilizers as well. So it's clear from this chapter that microbes play a very important role in welfare of human society.
	b) Industrial Microbial technology	2021	Students in this course will learn about microbes in food, spoilage of food and preservation techniques of food. Through this course, they also learn about microbiology of milk, fermented diary products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms. At the end of the course, the student will be able to use the preservation techniques for food and use this experience to be employed as quality control experts.

39. Physics

Course Code	Title of the Course	Years	of	Course Outcomes
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		Introduction	
PHY101	Classical Mechanics and Theory of Relativity	2021	<ul style="list-style-type: none"> • Understand the necessity of Action, Lagrangian, and Hamiltonian formalism. • Used 'D'Alembert principle and calculus of variations to derive the Lagrange equation of motion. • Describe the motion of a mechanical system using Lagrange-Hamilton formalism. • Apply essential features of a relativity problem (like motion under central force, periodic motions) to set up and solve the appropriate physics problems.
PHY102	Solid State Physics	2021	<ul style="list-style-type: none"> • Gain in-depth knowledge about the formation of various crystal structures and perform calculations on their elemental parameters. • Differentiate between various lattice types based on their lattice dynamics and then explain thermal properties of crystalline solids • Understand the electron motion in periodic solids and origin of energy bands in semiconductors. • To explain the basic transport theory for understanding the transport phenomenon in solids
PHY103(a)	Analog and Digital Electronics	2021	<ul style="list-style-type: none"> • Understand working of Different Semiconductor devices (Construction, Working Principles and V-I characteristics) and their applications. • Explain the construction and working of Operational amplifiers and applications • Design Digital circuits and their applications. • Understand the working of various analog communication techniques
PHY103(b)	Computational Methods & C Language	2021	<ul style="list-style-type: none"> • Apply basic knowledge of computational physics in solving the physics problems. • Program with the C or any other high-level language • Use various numerical methods in solving physics problems. • Analyze the outcome of the algorithm/program graphically.
PHY103(c)	Sensors and Transducers	2021	<ul style="list-style-type: none"> • Apply basic knowledge of sensors and transducers in understanding the measurement systems.

			<ul style="list-style-type: none"> • Study and understanding of various types of sensors • Study and understanding of various types of Transducers • Analyzetheoutcomeofthesignal conditioners like filters, detectors and amplifiers
PHY104(a)	Atomic and Molecular Physics	2021	<ul style="list-style-type: none"> • Havethebasicknowledgeof different atomic models, quantum nos and atomic spectra. • Understand the classical/quantumdescriptionof effect of magnetic field and Electric field on spectral lines. • Know the different types of rotation of the molecules and rotational constants and intern structure of the molecules. • Study the vibrational spectra of molecules and applications of vibrational spectra of molecules and applications of vibrational spectra
PHY104(b)	Optical, Microwave and Satellite Communications	2021	<ul style="list-style-type: none"> • understand microwave communication system • Understand functioning of Radar systems • Differentiate losses in optical fiber link and state transmission characteristics of optical fiber
PHY104(c)	Computer Architecture and Networking	2021	<ul style="list-style-type: none"> • Understand basics of logic circuits and computer functional blocks • Know machine instructions and assembly languages • Comprehend I/O organization • Appreciate differences between different memory devices
PHY201	Statistical Mechanics	2021	<ul style="list-style-type: none"> • Use ensemble theory to explain the behavior of Physical systems • ExplainthestatisticalbehaviorofBose-Einstein andtheirapplications. • Fermi –Dirac Statistics & Fluctuations
PHY202	EM Theory, Lasers & Modern Optics	2021	<ul style="list-style-type: none"> • Understandthe electro statistics and magneto statistics and also the properties of propagation of electromagnetic radiation in different media • Know about the properties of laser beam and the working of different lasers and applications • Describe the fourier analysis in optics problems and to understand the concept of holography • Analyze the propagation of light in optical fibers and to know the various applications of optical fibers
PHY203(a)	Nuclear Physics	2021	<ul style="list-style-type: none"> • Understand the basics of nuclear forces and their characteristics and also about various nuclear models

			<ul style="list-style-type: none"> • Know the various types of nuclear reactions and nuclear decay system • Understand the basic principles in nuclear accelerators and reactors and also their applications • Describe the various elementary particles and their conservation laws.
PHY203(b)	IC fabrication Techniques	2021	<ul style="list-style-type: none"> • Understand and compare crystal growth and Epitaxial deposition techniques • Understand structure and process of oxidation • Study the diffusion processes • Understand vacuum deposition techniques
PHY203(c)	Advanced Microprocessors And its Applications	2021	<ul style="list-style-type: none"> • Understanding of microprocessor architecture and evaluation • Develop skill of writing programs in ALP for various applications of 8085 & 8051 • Interface various peripherals with 8085 & 8051. • Understanding interrupts and direct memory access
PHY204(a)	Mathematical Physics	2021	<ul style="list-style-type: none"> • Understand the basics and applications of special functions in all the branches of Physics. • Use Fourier series and transformations as an aid for analyzing physical problems. • Apply integral transform to solve mathematical problems of Physics interest • Formulate and express a physical law in terms of complex variables and simplify it by use of coordinate transforms.
PHY204(b)	Introduction to VLSI design	2021	<ul style="list-style-type: none"> • Demonstrate a clear understanding of CMOS fabrication flow and technology scaling. • Analyze CMOS based logic circuit • Realize logic circuits with different design styles • Understand Front & Back end design aspects of simple VLSI Digital circuits
PHY204(c)	Material Science For Industrial Applications	2021	<ul style="list-style-type: none"> • Understand various experimental techniques for describing interaction of organic materials • Use error analysis for experimental data. • Knowledge about the different types of the Liquid crystals

			<ul style="list-style-type: none"> • Apply the knowledge of phase transformations for various applications
PHY301	Introductory Quantum Mechanics	2021	<ul style="list-style-type: none"> • Understand the need for quantum mechanical formalism and its basic principles. • Appreciate the importance and implication of vector spaces, Dirac Ket Bra notations, eigen value problem. • Understand the need of approximate methods in solving problems • Understanding scattering theory and its importance.
PHY302	Physics of Semiconductor Devices	2021	<ul style="list-style-type: none"> • Understand various experimental techniques for semiconductor or junctions and interfaces • Use I-V characteristics to understand the function of devices • Apply the knowledge of Junction transistors for various applications • To get familiarization with Power Devices and Semiconductor Technology
PHY303(a)	.Applied Spectroscopy	2021	<ul style="list-style-type: none"> • Understand the rotational and vibrational spectra of di molecules and their applications in structure determinations. • Know the Raman effect and its use in the structural analysis of various molecules. • Have the knowledge about various spectrophotometer and the functioning of various parts in SPECTROPHOTOMETER. • Understand the basic concepts of fluorescence and phosphorescence their applications in different fields
PHY303(b)	Condensed Matter Physics	2021	<ul style="list-style-type: none"> • They gain knowledge on elastic properties of solids and its importance. • Differentiate they gain knowledge on specific heat and Thermal importance. • Understand the importance of Fermi surface in electrical properties of Solids. • Gain knowledge on photoconductivity and its origin
PHY303(c)	3.Embedded Systems	2021	<ul style="list-style-type: none"> • understand about the basic functions and structure of embedded systems • Get familiarized with Embedded system Design Tools and Hardware

			<ul style="list-style-type: none"> • understand about the basic programming concepts of embedded systems • know about the applications of PIC microcontrollers
PHY305	Advances in Physics	2021	<ul style="list-style-type: none"> • Understand the concepts of nanotechnology • Physical and chemical techniques of nanomaterial synthesis • Concepts of Nano materials and Nano devices • Basics of remote sensing and understanding the concepts of Geographical Information system
PHY306(a)	Basic Spectroscopic Techniques	2021	<ul style="list-style-type: none"> • HavethebasicknowledgeofBohr's-SommerfieldQuantumtheoryofhydrogenlikeatom • Understandclassical/quantumdescriptionofelectronicsspectraofatom andmolecules • UsemicrowaveandRaman Spectroscopyforanalysis ofknown molecules • Correlateinfraredspectroscopicinformationofknownmoleculeswith heirphysicaldescription
PHY306(b)	Nanomaterials and Devices	2021	<ul style="list-style-type: none"> • Understanding the basics of nanomaterials • Acquireknowledgeofbasicapproachesto synthesize thenanaomaterials • Understand the physical and chemical properties of carbon nano tubes and nano structured materials. • Introduction to nanodevices
PHY401	Advanced Quantum Mechanics	2021	<ul style="list-style-type: none"> • Understand the concept of identifiable particles • Understand the Orbital Angular momentum spin angular momentum and general angular momentum and their importance in spectroscopy • Apply the symmetries principles in calculating the conserved currents and charges.
PHY402	Physics of Advanced Materials	2021	<ul style="list-style-type: none"> • Gainin-depthknowledge about theformation of various crystal • Growthtechniques • Understand the properties dielectric and ferroelectric materials • Understand different on Ferro and Anti ferro and ferro

			<p>magnetism and their applications</p> <ul style="list-style-type: none"> • Study functional materials
PHY403(a)	Photonics		<ul style="list-style-type: none"> • In depth knowledge on different lasers and their application • Importance of Fiber optics and their components in communication and sensors • Significance and role of waveguides and optics in integrated optics • Advances in photonic crystals, circuits and applications with respect to conventional devices.
PHY403(b)	Solar Energy-Thermal and Photovoltaic Properties	2021	<ul style="list-style-type: none"> • Understand the thermal and light components of solar energy, basic concepts and measurement of solar radiation. • Learn the theoretical aspects of solar collectors, performance evaluation and application. • Know the concepts of solar cells, types and fabrication procedures of source solar cells. • Provide knowledge on cell efficiency measurements.
PHY403(c)	Vacuum and Thin Film Technology	2021	<ul style="list-style-type: none"> • Basic theoretical concepts of the kinetic theory of gases applicable to vacuum technology and also the principles and construction of various vacuum pumps and gauges. • Design and construction of various techniques for the preparation of thin films • Theoretical aspects to understand the growth and properties of thin films • Various industrial applications of thin films
PHY405	Advanced Characterization Techniques	2021	<ul style="list-style-type: none"> • Describe various Instrumentation – Essential parts of spectrophotometer. • Understand the theoretical techniques Resonance Spectrometers and Mass Spectrometer • Understand use of various spectroscopic techniques and their application to the various fields of physics. • Understand the Advanced Spectroscopic and Microscopic Techniques
PHY406(a)	Wireless Communications	2021	<ul style="list-style-type: none"> • understand the basics of digital modulation techniques • Understand various coding and error correction techniques • Know GSM mobile communication standards, its architecture, logical channels, advantages and limitations.

			<ul style="list-style-type: none"> • Familiarize with optical and satellite communication techniques
PHY406(b)	Vacuum Technology & Applications	2021	<ul style="list-style-type: none"> • Basic theoretical concepts of the kinetic theory of gases applicable to vacuum technology and also the principles and construction of various vacuum pumps and gauges for the production and measurement of vacuum • Design and construction of various components for the construction of vacuum systems for the preparation of thin films • Various techniques used for the growth of thin films • Various industrial applications of vacuum technology and thin films

Instrumentation

Course Code	Title of the Course	Years of Introduction	Course Outcomes
INS –101	1. Introduction to Instrumentation and Control System	2021	<ul style="list-style-type: none"> • Understand fundamentals of Instrumentation system • Understand and design open loop and closed loop control system • Understand time response analysis • Design and Analysis of Root Locus, Frequency Response Systems
INS – 102	2. Analog Devices and Industrial Electronics	2021	<ul style="list-style-type: none"> • Understand and describe specifications, features and capabilities of electronic devices. • Understand the basics of operational amplifiers and their applications • Understand fundamental of semiconductors and power devices • Select appropriate device for circuit operation.
INS - 103(a)	1. Digital Techniques and Principles of Communications	2021	<ul style="list-style-type: none"> • Learn working and applications of FET and MOSFET. • Learn the basics of op-amps. • Learn the importance of digital electronics. • Learn the process of communication and its importance.
INS - 103(b)	2. Power Electronics	2021	<ul style="list-style-type: none"> • Students will be able to understand the working of FET, JFET, MOSFET. □□□□□ Understand working of Controlled Rectifiers, Inverters and DC to DC converters.

			<ul style="list-style-type: none"> □□□□ Understand the inverters • Understand the Working of AC/DC Drives.
INS - 103(c)	3. Industrial Product Instrumentation	2021	Design the instruments Learn the hardware design Learn the digital design Learn the PCB design
INS - 104(a)	1. Programming in “C”	2021	<ul style="list-style-type: none"> • Understand the basic principles of C language. • Understand To teach basic Programs in C Language. • Understand the simple Array Programs in C Language. • Understand the File management and Linked List Programs.
INS - 104(b)	2. Renewable Sources of Energy	2021	<ul style="list-style-type: none"> • Understand about different energy sources • Learn the importance of Solar energy • Learn the usage of wind energy • Learn the importance of bio-mass energy
INS -104(c)	3. Opto Electronics	2021	<ul style="list-style-type: none"> • Learn fundamentals of laser and their applications • Know the different optical sources and detectors • Understand the optical components and instruments • Learn the basics of optical fibres and its applications
INS – 201	1. Industrial Instrumentation	2021	<ul style="list-style-type: none"> • learn the introduction in Process Instrumentation . • learn To teach the Instrumentation in Iron and Steel Industries. • learn the Instrumentation in Petrochemical. • know the Instrumentation in Pharmacy and Thermal Power Stations.
INS – 202	2. Electronic Instrumentation	2021	<ul style="list-style-type: none"> • Learn about analogue Measuring Instruments • Learn Principle, operation and construction and details of analog and digital measuring instrumentation. • analyze and design function generator, square wave generator and digital multi meter. • Learn Spectrum Analyzers, Frequency Synthesizers, Digital tachometer, Digital watt meter Digital Capacitance meter
INS -203(a)	1. Sensors and Signal Conditioners	2021	<ul style="list-style-type: none"> • Understand fundamentals of sensor/Transducers • Understand the concept of Signal Conditioners. • Understand the concepts Temperature transducer , flow transducer

			<p>and level sensors</p> <ul style="list-style-type: none"> • Learn Pressure Transducers, Manometers and Elastic transducers
INS -203(b)	2.Network Analysis	2021	<ul style="list-style-type: none"> • Under stand different Network theorems • Lear the use of Laplace Transform in the Network Analysis • Under stand the concept of complex frequency • Learn the concepts in Resonance in series and parallel circuits
INS -203(c)	3. Spectroscopic Instrumentation	2021	<ul style="list-style-type: none"> • Understand the basics of Molecular Spectroscopy • Understand the basics of RAMAN Spectroscopy • Understand the basics of Spectrophotometry • Understand the basics of Fluorescence and Phosphorescence Spectroscopy
INS -204(a)	1.Microprocessors and Interfacing	2021	<ul style="list-style-type: none"> • learn assembly programming language • demonstrate the knowledge of addressing modes, instruction sets. • able to analyze and design assembly level programmes and timing diagrams. • able to analyze programmable peripheral devices, 8255, 8257/8237, 8259.
INS -204(b)	2. Robotics	2021	<ul style="list-style-type: none"> ☐☐To develop the student's knowledge in various robot structures and their workspace. • To develop student's skills in performing spatial transformations associated with rigid body motions. ☐☐To develop student's skills in perform kinematics analysis of robot systems. • To provide the student with knowledge of the singularity issues associated with the operation
INS -204(c)	3. Electronic Measurement Instruments	2021	<ul style="list-style-type: none"> • Learn the static and Dynamic characteristics of instruments, • Learn the signal Converters: I To P / P To I Converter • Understand the electronic Instruments for Measuring Basic Parameters

			<ul style="list-style-type: none"> • Understand the Instrument for Generation and Analysis of Waveforms
INS – 301	1.Analytical Instrumentation	2021	<ul style="list-style-type: none"> • The Students get will be versed with the principles, construction and working of various analytical instruments.. • Students get details information about the applications of analytical techniques in medicine, industry etc. • Understand the Polarographs • Understand the NMR and ESR Spectrometers
INS – 302	2.Digital Signal Processing	2021	<ul style="list-style-type: none"> • Gain knowledge on the basic elements of Digital Signal Processing • Learn the analysis of discrete-time systems • Understand the discrete Fourier Transform • Learn design of digital IIR filters:
INS -303(a)	1. Biomedical Instrumentation	2021	<ul style="list-style-type: none"> • Identify various Bio-potential and their specification in terms of amplitude and frequency. • Decide the applications of therapeutic instruments for treatment purpose. • Decide the applications of therapeutic instruments for treatment purpose. • Understand applications of imaging instruments and the modalities involved in each technique.
INS -303(b)	2. Micro Electro Mechanical Systems	2021	<ul style="list-style-type: none"> • Basic structure of MEMS and design • Learn Scaling laws in miniaturization • Analyze applications of MEMS and their importance as sensors • Understand the Microsystem Design and its considerations
INS -303(c)	3.Instrumentation for Environmental Science	2021	<ul style="list-style-type: none"> • Learn necessity of instrumentation & control for environment • Gain knowledge inGround water monitoring and waste water monitoring • Learn the effects of air pollution • Understand air monitoring. Flow monitoring and Rain water harvesting
INS – 304	Analytical	2021	<ul style="list-style-type: none"> • .Understand the fundamentals of microcontroller.

	Instrumentation Lab		<ul style="list-style-type: none"> • Understand . addressing modes, Instructions and programming in 8051 • Understand 8051 Memory and I/O device Interfacing. Interrupts and Timer/counters • Learn8051 Memory and I/O device Interfacing
INS – 305	Microcontrollers and Interfacing	2021	<ul style="list-style-type: none"> • Understand internal block diagram of computer • know the Micro Programmed Control and organization of computer • Know The Memory System and Input-Output Organization • Know thePipeline And Vector Processing
INS -306(b)	1. Industrial Organization and Management	2021	<ul style="list-style-type: none"> • Learn the basics Industrial Management and Business organization • Learn the Quality, Inspection and Environment Management • Learn the Production Planning, Inventory Control and Supply Chain Management • Learn the Human Resources Management
INS - 401	1.Introduction to VLSI Circuits	2021	<ul style="list-style-type: none"> • Understand the fundamentals of VLSI systems • Learnthe physical Structure and Fabrication of CMOS ICs. • Understand the elements of Physical Design and Electrical Characteristics of MOSFETs • Understand the electronic analysis of CMOS logic gates
INS – 402	2.Embedded Systems and Real time Operating Systems	2021	<ul style="list-style-type: none"> • Learn the basics of o embedded systems and pic microcontroller • Understand the concepts of ARM processors and architecture of ARM 7 • Learn the real time operating systems and concepts • Understand the RTOS application domains
INS - 403(a)	1. Programmable Logic Controllers	2021	<ul style="list-style-type: none"> • Learn Process Dynamics and Process Control Action • Learn Process Controllers and Tuning • Learn Analysis of Control Loop • Learn Multivariable Controland Intelligent Controllers
INS - 403(b)	2.Computational Mathematics	2021	<ul style="list-style-type: none"> • Learn the basics of Special Functions and their importance in different fields • Learn the fundamentals of Integral Transforms and its

			<ul style="list-style-type: none"> applications in communications • Understand the different numerical techniques and their applications • Understand the complex Variables and their importance
INS - 403(c)	3. Electrical Engineering Materials	2021	<ul style="list-style-type: none"> • Learn the concepts of bonding and different crystal systems • Understand the concepts different polarizations and importance of dielectrics • Learn the basics of semiconductors and their importance in devices • Learn the basics of shape memory alloys and its importance
INS – 405	Project Work	2021	<ul style="list-style-type: none"> • Get the experience of working on a problem independently with planning and execution. • Develop skills related to presentation of data, analysis discussion of the results and draw conclusions • Learn the importance of research for development and self sustaining • Understand the need of the society
INS - 406(a)	1. Agro Based Instrumentation	2021	<ul style="list-style-type: none"> • Understand the Properties of Soil. • Understand the concept of flow diagram of Sugar Plant. • Understand the role of Irrigation System . • Understand the working of SCADA and DMA in agriculture.
INS - 406(b)	2.Industrial Automation	2021	<ul style="list-style-type: none"> • Define automation, it's importance, expectations from automation and applications in industry. • Understand the working of these systems and should be able to determine hardware and software requirements of SIS and SIL. • Understand evolution and architecture of DCS, hierarchical control in DCS, programming DCS • Understand the fundamentals of Open loop and Closed loop controls

Electronics

Course Code	Title of the Course	Years of Introduction	Course Outcomes
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ELE-101	Analog Integrated Circuits and Applications	2021	<ul style="list-style-type: none"> ➤ Understand the necessity of Action, Voltage regulators and Signal generators. ➤ Used Nonlinear Circuits, Amplifiers, and Phase-Locked Loops in various applications. ➤ Describe the A-D and D-A Converters in different applications. ➤ Apply essential features of Op. Amp. Applications used in the Industry.
ELE-102	Digital Integrated Circuits and Applications	2021	<ul style="list-style-type: none"> ➤ Gain in-depth knowledge about the Flip-Flops, Counters and Registers and their symbols used in digital integrated circuits and their function. ➤ Differentiate various IC Logic families used in Digital circuits. ➤ Understand the various semiconductor memories such as RAMs and ROMs, Programmable Logic devices and development software. ➤ To explain the basic function of various digital instruments such as DVMs, MP based Ramp type DVM, Digital multimeters, Frequency meter, Phase meter, capacitance meter and their Automation.
ELE-103 (a)	Programming in C with data structures	2021	<ul style="list-style-type: none"> ➤ Understand the fundamentals of C Language such as Expressions and I/O Statements, Operators and control statements. ➤ Explain the arrays, User Define Functions, Pointers and their applications ➤ Understand about Declaration of structure, Stack and Recursion and their applications. ➤ Understand the Linked Lists, Trees, different Algorithms, and their Applications. They are able to write the programs in controlling devices.
ELE-103 (b)	Python Programming	2021	<ul style="list-style-type: none"> ➤ Understand the basics of Dynamic Types, Conventions, String Operations, Operators, Loop, Lists and functions. ➤ Learn about Object and Classes in Python and compare with any other high-level language. ➤ Use Functions and Modules in solving various problems. ➤ Understand I/O and Error Handling in Python, solve the problems.
ELE-103 (c)	Programming in Matlab	2021	<ul style="list-style-type: none"> ➤ Apply basic knowledge of various instructions in Matlab and script files.

			<ul style="list-style-type: none"> ➤ Study and understanding of various control flow instructions. ➤ Study and understanding of various Structured Data Types ➤ AnalyzetheoutcomeofthePlotting in Mat lab,Handle Graphics for Manipulating Plots, Writing the programs in solving the problems for various applications.
ELE-104 (a)	Mathematical Methods of Signal & System analysis	2021	<ul style="list-style-type: none"> ➤ Havethebasicknowledgeof different Continuous-Time and Discrete-Time Signalsand systems and their properties. ➤ Understand the <i>Fourier Series Representation of Periodic Signals</i>and their properties. ➤ Know the Properties, Analysis and Characterization of LTI systems using the Laplace transforms. ➤ Study the Properties of the Z- Transform, Analysis and Characterization of LTI systems using the z-transforms.
ELE-104 (b)	Optical Communications	2021	<ul style="list-style-type: none"> ➤ Understand optical fibers and waveguides used in communication system ➤ Understand Attenuation and wave propagation in Optical Fibers. ➤ Study different types sources and detectors used in Optical Communication system. ➤ Differentiate losses in optical fiber link and state transmission characteristics of optical fiber
ELE-104 (c)	Wireless communications	2021	<ul style="list-style-type: none"> ➤ Understand the basics of digital modulation techniques ➤ Understand various coding and error correction techniques ➤ Know GSM mobile communication standards, its architecture, logical channels, advantages and limitations. ➤ Familiarize with optical and satellite communication techniques
ELEP-105	Analog and Digital IC's (Lab)	2021	
ELEP-106	Programming in C (Lab)	2021	
ELE-201	Advanced Microprocessors and Microcomputers	2021	<ul style="list-style-type: none"> ➤ Understanding of microprocessor architecture and evaluation ➤ Develop skill of writing programs in ALP for various applications of 8086 Microprocessor ➤ Interface various peripherals with 8086. ➤ Understanding interrupts and direct memory access
ELE-202	Digital Communications	2021	<ul style="list-style-type: none"> ➤ Understandthe electro statistics and magneto statistics and also the

			<p>properties of propagation of electromagnetic radiation in different media</p> <ul style="list-style-type: none"> ➤ Know about the properties of laser beam and the working of different lasers and applications ➤ Describe the fourier analysis in optics problems and to understand the concept of holography ➤ Analyze the propagation of light in optical fibers and to know the various applications of optical fibers
ELE-203(a)	Semiconductor Materials and Devices	2021	<ul style="list-style-type: none"> ➤ Understand various experimental techniques for semiconductor or junctions and interfaces, I-V characteristics to understand the function of devices. ➤ To understand the function of Solid State Microwave devices. ➤ To understand the various Power semiconductor devices and their applications ➤ To get familiarization with Optoelectronic Devices and their properties.
ELE-203(b)	Sensors and Transducers	2021	<ul style="list-style-type: none"> ➤ Apply basic knowledge of sensors and transducers in understanding the measurement systems. ➤ Study and understanding of various types of Displacement and Strain Transducers ➤ Study and understanding of various types of Pressure transducers ➤ Study and understanding of Opto -Electronic Transducers
ELE-203(c)	Atmospheric and Space Instrumentation Techniques	2021	<ul style="list-style-type: none"> ➤ Understanding of Dynamics atmospheric structure ➤ Understand the various elements in the atmosphere. ➤ Understanding of various Ground Based Instruments for the Measurement of atmospheric elements. ➤ Enrich the measurement techniques such as Radars.
ELE-204 (a)	Control Systems	2021	<ul style="list-style-type: none"> ➤ Understand the basics and applications of open loop and closed loop , Mathematical modelling of dynamic systems. ➤ Know the <i>Transient and steady-state response analyses</i> in control systems. ➤ Understanding of Root Locus analysis. ➤ Design the control systems using frequency response.
ELE-204 (b)	Medical Instrumentation	2021	<ul style="list-style-type: none"> ➤ Understanding of Bio-signal analysis and recording. ➤ Understanding of Physiological Assist Devices such as Pacemakers, Defibrillators, Nerve and Muscle Stimulators, Heart Lung Machine, Kidney Machine and Special Equipment. ➤ Use of Biotelemetry and Operation Theatre Equipment

			<ul style="list-style-type: none"> ➤ Understanding of safety and Advanced Biomedical Instrumentation techniques.
ELE-204 (c)	Data Mining and Information Security	2021	<ul style="list-style-type: none"> ➤ Understand Data warehousing components ➤ Understanding of Data mining metrics, data mining tasks, and exploratory Data Analysis. ➤ Knowledge about the Security Trends and different algorithms. ➤ Apply the knowledge of Cryptography techniques for Digital Signatures and Authentication Protocols.
ELE-301	Digital Signal Processing	2021	<ul style="list-style-type: none"> ➤ Understand the need for Sampling of Continuous-Time signals and its basic principles. ➤ Understand the need of Structures for Discrete-time systems ➤ Understand the need of Discrete Fourier Transform methods in solving problem ➤ Understanding the Architecture of TMS320C5X processor, assembly language instructions and its importance.
ELE-302	Digital system Design-VHDL	2021	<ul style="list-style-type: none"> ➤ Understand various Basic Language Elements and model analysis. ➤ Understand Data flow and structural modeling. ➤ Apply the knowledge Subprograms, Overloading, Packages and Libraries for various applications ➤ To get familiarization with Advanced features for Model simulation
ELE-303(a)	Microcontrollers and Applications	2021	<ul style="list-style-type: none"> ➤ Understand about the basic functions and structure of Microcontrollers such as 8051. ➤ Get familiarized with 8051 controllers ➤ understand about the basic Atmel microcontrollers and programming ➤ Understanding of PIC 16F8XX flash microcontrollers and their interfacing with I/O devices for industrial applications
ELE-303(b)	Computer organization	2021	<ul style="list-style-type: none"> ➤ Understand basics of structures of Computers. ➤ Know Register Transfer language and micro operations ➤ Understand Microprogrammed control, Computer Arithmetic and Memory system. ➤ Input-Output Organization, Pipeline and Vector Processing.
ELE-303(c)	Digital Image Processing	2021	<ul style="list-style-type: none"> ➤ understand about the Fundamentals of Image Processing ➤ Get familiarized with Image enhancement. ➤ Understand about the Image Segmentation and Feature Analysis.

			<ul style="list-style-type: none"> ➤ Understand about the Multi Resolution Analysis and Compressions.
ELE-305	Peripheral interface controllers VHDL & Microcontrollers (Lab) (Hands on training)	2021	<ul style="list-style-type: none"> ➤ understand about the basics of Assembler and Assembler Programs ➤ Get familiarized with PIC microcontrollers and interfacing I/O devices.
ELE-306 (a)	Microprocessors, PC Hardware and Interfacing	2021	<ul style="list-style-type: none"> ➤ Havethebasicknowledgeof8086 Based system design and peripheral interfaces ➤ Understand the Motherboard of IBM PC ➤ Understand with Peripherals ➤ Understand about I/O Serial and Parallel ports.
ELE-306 (b)	Satellite Communications	2021	<ul style="list-style-type: none"> ➤ Understanding the basics of Satellite Communication ➤ AcquireknowledgeofMultiple Access Techniques ➤ Understand theSatellite Orbits and Inclination. ➤ Understanding of Satellite systems, Indian satellites and applications
ELE-401	Advanced CommunicationSystems	2021	<ul style="list-style-type: none"> ➤ Understand the Cellular concept. ➤ Understand the Mobile Radio propagation and channel coding ➤ Understand the Multiple Radio Access, Multiple Division Techniques, Channel Allocation. ➤ KnowtheOptical, Satellite communications and their applications.
ELE-402	Introduction to VLSI circuits	2021	<ul style="list-style-type: none"> ➤ Demonstrate a clear understanding of CMOS fabrication flow and technology scaling. ➤ Analyze CMOS based logic circuit ➤ Realize logic circuits with different design styles ➤ Analysis of CMOS Logic Circuits and Designing High-speed CMOS Logic Networks.
ELE-403(a)	Data Communications and Networking	2021	<ul style="list-style-type: none"> ➤ Understand the basic conceptsnetworks and Transmission of digital data. ➤ Know the different types of Multiplexing and Data link protocols. ➤ Understand the various types of local area networks. ➤ Understand the ISDN, ATM, SONET and related frames and protocols.
ELE-403(b)	Industrial Electronics	2021	<ul style="list-style-type: none"> ➤ UnderstandtheSolid State Devices Used in Industrial Logic Circuits. ➤ Know the use of Solid state Devices in Power electronics. ➤ Understand input and output devices such as sensors and drives.

			<ul style="list-style-type: none"> ➤ Know the Types of robots and their function in the Industry.
ELE-403 (c)	EMI and EMC	2021	<ul style="list-style-type: none"> ➤ Understanding of EMI Environment. ➤ Know the Specifications, Standards, Limits of EMI. ➤ Know the Grounding principles and Bonding guidelines. ➤ Understanding the theory of Shielding, Need of Gaskets and their properties, Basic Filter Component Characteristics and guidelines.
ELE-406 (a)	Embedded systems with PIC Microcontrollers	2021	<ul style="list-style-type: none"> ➤ Understanding of the basics and Characteristics of IoT, IoT development boards. ➤ Know the Wireless Technologies. ➤ Know the data handling and analysis of the data. ➤ The use of IoT for Automation, Management, Logistics, Agriculture, Health and Lifestyle, Industry.
ELE-406 (b)	Microwaves	2021	<ul style="list-style-type: none"> ➤ Understanding of Electromagnetic Theory ➤ Understanding of Transmission line theory ➤ Know different types of Waveguides. ➤ Use of various types of antennas.

41. Psychology

Course Code	Title of the Course	Years of Introduction	Course Outcomes
PSY 101	General Psychology-I (CC)	2021	<ol style="list-style-type: none"> 1. Understood the concepts and scope of psychology 2. Comprehended the biological basis of behavior 3. Studied the perception and sensation 4. Understood the concepts and learning theories
PSY 102	Social Psychology (CC)	2021	<ol style="list-style-type: none"> 1. Understood the concepts of social psychology 2. Comprehended the social perception and cognition. 3. Studied the Socialization 4. Understood the meaning and theories attitudes
PSY 103A	a. Psychopathology-I (CF)	2021	<ol style="list-style-type: none"> 1. Understood the meaning abnormal behavior and historical and current trends 2. Comprehended the models of abnormal behaviour and approaches to therapies 3. Learned about classification and assessment of abnormal behaviour 4. Able to evaluate different approaches to therapies for abnormal

			behaviour
PSY 103B	b. Psychological Measurement-I(CF)	2021	<ol style="list-style-type: none"> 1. Understood the assessment and psychological measurements 2. Comprehended the development of psychological tests and principles of test construction. 3. Learned the Principles of Test Construction 4. Understood the test Development and test Standardization Procedures
PSY 103C	c. Positive Psychology (CF)	2021	<ol style="list-style-type: none"> 1. Understood the human strength of positive psychology 2. Acquainted students with positive subjective states and processes 3. Enabled students to appreciate importance of positive Individual Traits 4. Understood the Positive behaviour in Institutions
PSY 104A	a. Child Development Psychology	2021	<ol style="list-style-type: none"> 1. Exposed the students to the basics of Child Development 2. Helped the student understand research in child development 3. Understood the biological development of a child 4. Able to evaluated personality development of a child
PSY 104B	b. Psychological Measurement & Statistics	2021	<ol style="list-style-type: none"> 1. The students acquainted with intelligence and achievement tests 2. The students learned the measurement of personality tests 3. They are clear in understanding the Statistics for Psychological Measurement 4. They have knowledge on Distribution of Scores on Variables.
PSY 104C	c. Forensic Psychology	2021	<ol style="list-style-type: none"> 1. Exposed the student to the basics of forensic Psychology 2. Students understood the concept of psychology of Crime 3. They acquainted knowledge on psychological investigation of Crime 4. Students understood psychology of violence of various forms.
PSY 201	General Psychology -II (CC)	2021	<ol style="list-style-type: none"> 1. The students understood the fundamentals of motivation and emotion 2. They understood the basic concepts of memory and forgetting 3. Comprehended the thinking and intelligence 4. Able to evaluated the personality of individuals
PSY 202	Applied Social Psychology-(CC)	2021	<ol style="list-style-type: none"> 1. Students understood about Social Influence 2. Acquainted with social exchange process in social behaviour. 3. Comprehended the prejudice and discrimination

			4. To understand what is psychological groups and individuals.
PSY 203A	a. Psychopathology-II(CF)	2021	<ol style="list-style-type: none"> 1. Understood anxiety and mood disorders 2. Acquainted with somatic disorders. 3. Studied Psychosis and Cognitive Disorders 4. Understood Psychological Disorders Across the Life Span
PSY 203B	b. Psycho-Diagnosis (CF)	2021	<ol style="list-style-type: none"> 1. Acquired the knowledge of psychological tests and their use in diagnosis. 2. Students are able to diagnose patients with the help of projective tests. 3. Understood of different diagnostic systems. 4. Learned how to take case history of patients and to make differential diagnosis
PSY 203C	c. Computer Application in Psychological Research-(CF)	2021	<ol style="list-style-type: none"> 1. Understood the basic components of computer 2. Acquainted with Ms Office, power point and internet services. 3. Comprehended the application of computer knowledge through creating emails, scientific journals and data scoring 4. Able to understand Statistical Packages and its application
PSY 204A	a. Life Span Development Psychology : Infancy to Adolescence (Prenatal to Adolescents)	2021	<ol style="list-style-type: none"> 1. To understood human development 2. The students became aware of infancy and babyhood 3. To comprehended the Early and Late Childhood and Adolescence. 4. The students are aware of the development of Adolescence
PSY 204B	b. Consumer Behavior	2021	<ol style="list-style-type: none"> 1. The students understood the concept of consumer behaviour and market research 2. Comprehended the economic theory of buyer behaviour 3. Studied the effect of psychological theories of motives 4. Acquainted with the advertisement - advertisement purposes-role of communication
PSY 204C	c. Industrial & Organizational Psychology	2021	<ol style="list-style-type: none"> 1. Understood the psychological, social and economic contribution in developing industrial psychology. 2. Comprehended the personal psychology 3. Have knowledge the selection, interviews and evaluation.

			4. Comprehended the employment interview
PSY 301	Counseling Psychology (CC)	2021	<ol style="list-style-type: none"> 1. Understood the meaning of counseling and ethics in counseling 2. Comprehended the process of counseling and techniques 3. Understood the counseling process 4. Acquainted with the counseling techniques
PSY 302	Psychology of Personality (CC)	2021	<ol style="list-style-type: none"> 1. Understood nature of personality. 2. Realized the determinants of personality 3. Found that the development of Personality. 4. Understood the Assessment of personality.
PSY 303A	a. Organizational Behavior & HRM (GE)	2021	<ol style="list-style-type: none"> a. The students understood organization and the Individual differences b. Comprehended the motivation and leadership c. They realized how to take decision making and organizational effectiveness. d. The students are aware of organizational change due to development
PSY 303B	b. Therapeutic Approaches in Counseling-I	2021	<ol style="list-style-type: none"> 1. enabled the student to have an insight into the psychoanalytic Approach in counseling 2. The student have understood the behaviour therapy 3. They become aware of the procedures involved in the person centered Approach in counseling. 4. Understood the concept and application of Existential Therapy
PSY 303C	c. Health Psychology(GE)	2021	<ol style="list-style-type: none"> 1. Understood the concept of the Health psychology 2. Acquainted with and health behaviour. 3. Comprehended the health behaviour enhancement and management 4. Realized the future of the health psychology.
PSY 305	Stress Management Theory & Practical	2021	<ol style="list-style-type: none"> 1. To introduce meaning of stress and psychophysiology 2. To realize the illness/disease and intervention 3. To understand the techniques of stress management 4. To comprehend and implement the techniques of stress management and counseling
PSY 306	Personality Development (OE)	2021	<ol style="list-style-type: none"> 1. Studied biological, psychological determinants 2. The students aware of socio cultural determinants & Soft Skills

			<ol style="list-style-type: none"> 3. The students acquainted with soft skills 4. They learned more on Soft skills
PSY 401	Therapeutic Approaches in Counseling-II(CC)	2021	<ol style="list-style-type: none"> 1. To enable the student to have an insight into the Gestalt Therapy 2. To acquaint with the therapeutic Approach to the Reality Therapy 3. To enable the students to cognitive behaviour therapy 4. The students involved in the An Integrative Approach
PSY 402	Theories of Personality (CC)	2021	<ol style="list-style-type: none"> 1. Understood the Psychoanalytic Approach 2. Learned on behavioural approaches to personality. 3. The students comprehended the Humanistic approach 4. The students acquainted with the eastern theories of personality
PSY 403A	a. Research Methodology-(GE)	2021	<ol style="list-style-type: none"> 1. Understood basic research and applied research including experimental research. 2. The students comprehended the problem & hypothesis 3. Gained knowledge on Sampling & Data Collection 4. Understood the application of research designs
PSY 403B	b. Organizational Development (GE)	2021	<ol style="list-style-type: none"> 1. Learned the assessment, instructional objectives. 2. Applied the knowledge of training and development incorporating the findings of research 3. Studied the transfer and maintenance of training and alternative training media 4. Gained the evaluating training effectiveness
PSY 403C	c. Rehabilitation Psychology (GE)	2021	<ol style="list-style-type: none"> 1. The students understood historical development – Models of disabilities in the past and present scenario 2. The students comprehended Assessment of Disability, Psychological Aspects 3. The students are aware of Behavioral Management 4. They acquainted with Organizational services
PSY 406	Life Skills (OE)	2021	<ol style="list-style-type: none"> 1. Learned the concept of life skills and its importance in relation to personality development of an individual. 2. They became aware of the components of life skills and the method of imparting knowledge of life skills. 3. The students have learned more on Life Skills in Specific 4. They acquainted with Self management skills

Counselling Psychology

Course Code	Title of the Course	Years of Introduction	Course Outcomes
PSY 101	General Psychology-I (CC)	2021	<ol style="list-style-type: none"> 5. Understood the concepts and scope of psychology 6. Comprehended the biological basis of behavior 7. Studied the perception and sensation 8. Understood the concepts and learning theories
PSY 102	Social Psychology (CC)	2021	<ol style="list-style-type: none"> 5. Understood the concepts of social psychology 6. Comprehended the social perception and cognition. 7. Studied the Socialization 8. Understood the meaning and theories attitudes
PSY 103A	a. Psychopathology-I (CF)	2021	<ol style="list-style-type: none"> 5. Understood the meaning abnormal behavior and historical and current trends 6. Comprehended the models of abnormal behaviour and approaches to therapies 7. Learned about classification and assessment of abnormal behaviour 8. Able to evaluate different approaches to therapies for abnormal behaviour
PSY 103B	b. Psychological Measurement-I(CF)	2021	<ol style="list-style-type: none"> 5. Understood the assessment and psychological measurements 6. Comprehended the development of psychological tests and principles of test construction. 7. Learned the Principles of Test Construction 8. Understood the test Development and test Standardization Procedures
PSY 103C	c. Positive Psychology (CF)	2021	<ol style="list-style-type: none"> 1. Understood the human strength of positive psychology 2. Acquainted students with positive subjective states and processes 3. Enabled students to appreciate importance of positive Individual Traits 4. Understood the Positive behaviour in Institutions
PSY 104A	a. Child Development Psychology	2021	<ol style="list-style-type: none"> 5. Exposed the students to the basics of Child Development 6. Helped the student understand research in child development 7. Understood the biological development of a child

			8. Able to evaluated personality development of a child
PSY 104B	b. Psychological Measurement & Statistics	2021	<ul style="list-style-type: none"> 5. The students acquainted with intelligence and achievement tests 6. The students learned the measurement of personality tests 7. They are clear in understanding the Statistics for Psychological Measurement 8. They have knowledge on Distribution of Scores on Variables.
PSY 104C	c. Forensic Psychology	2021	<ul style="list-style-type: none"> 5. Exposed the student to the basics of forensic Psychology 6. Students understood the concept of psychology of Crime 7. They acquainted knowledge on psychological investigation of Crime 8. Students understood psychology of violence of various forms.
PSY 201	General Psychology -II (CC)	2021	<ul style="list-style-type: none"> 1. The students understood the fundamentals of motivation and emotion 2. They understood the basic concepts of memory and forgetting 3. Comprehended the thinking and intelligence 4. Able to evaluated the personality of individuals
PSY 202	Applied Social Psychology-(CC)	2021	<ul style="list-style-type: none"> 1. Students understood about Social Influence 2. Acquainted with social exchange process in social behaviour. 3. Comprehended the prejudice and discrimination 4. To understand what is psychological groups and individuals.
PSY 203A	a. Psychopathology-II(CF)	2021	<ul style="list-style-type: none"> 1. Understood anxiety and mood disorders 2. Acquainted with somatic disorders. 3. Studied Psychosis and Cognitive Disorders 4. Understood Psychological Disorders Across the Life Span
PSY 203B	b. Psycho-Diagnosis (CF)	2021	<ul style="list-style-type: none"> 1. Acquired the knowledge of psychological tests and their use in diagnosis. 2. Students are able to diagnose patients with the help of projective tests. 3. Understood of different diagnostic systems. 4. Learned how to take case history of patients and to make differential diagnosis
PSY 203C	c. Computer Application	2021	

	in Psychological Research-(CF)		<ol style="list-style-type: none"> 1. Understood the basic components of computer 2. Acquainted with Ms Office, power point and internet services. 3. Comprehended the application of computer knowledge through creating emails, scientific journals and data scoring 4. Able to understand Statistical Packages and its application
PSY 204A	a. Life Span Development Psychology : Infancy to Adolescence (Prenatal to Adolescents)	2021	<ol style="list-style-type: none"> 1. To understand human development 2. The students became aware of infancy and babyhood 3. To comprehend the Early and Late Childhood and Adolescence. 4. The students are aware of the development of Adolescence
PSY 204B	b. Consumer Behavior	2021	<ol style="list-style-type: none"> 1. The students understood the concept of consumer behaviour and market research 2. Comprehended the economic theory of buyer behaviour 3. Studied the effect of psychological theories of motives 4. Acquainted with the advertisement - advertisement purposes- role of communication
PSY 204C	c. Industrial & Organizational Psychology	2021	<ol style="list-style-type: none"> 1. Understood the psychological, social and economic contribution in developing industrial psychology. 2. Comprehended the personal psychology 3. Have knowledge the selection, interviews and evaluation. 4. Comprehended the employment interview
CPSY 301	Counseling Process	2021	<ol style="list-style-type: none"> 1. Understood the counseling as helping profession 2. To acquire the relation with other helping professions 3. To know the legal and ethical issues 4. Developed the importance of verbal and non verbal skills in counseling sessions.
CPSY 302	Counseling Skills	2021	<ol style="list-style-type: none"> 1. Understood the micro-skills of counselling through a series of practices. 2. Got an idea about who to understand the people and interpret their feelings with positive appreciation 3. To provide a space where participants can grow, in the sense of

			<p>allowing an encounter with them first and based on this encounter to achieve a better understanding of how they impact on other people.</p> <p>4. The ability to examine and assess the clients with scientific manner.</p>
CPSY 303A	a. Therapeutic Approaches in Counseling-I	2021	<ol style="list-style-type: none"> 1. Understood the various Therapeutic Approaches of counseling. 2. Understood the techniques relevant to therapies. 3. To acquires the basic procedures. 4. Learned how to touch in the insight of the client
CPSY 303B	b. Counseling in Organizational Settings	2021	<ol style="list-style-type: none"> 1. Understood the basic Principles of Organizational behaviour 2. Acquired the role of counselor at work place and identified the causes and problems in work environment 3. To adopted the leadership styles to lead the employees. 4. Enhanced the adjustment and commitment styles in work environment.
CPSY 303C	c. Health Psychology (GE)	2021	<ol style="list-style-type: none"> 1. Understood the concept of the Health psychology 2. Acquainted with and health behaviour. 3. Comprehended the health behaviour enhancement and management 4. Realized the future of the health psychology.
CPSY 305	Stress Management & Counseling Psychology Theory & Practical	2021	<ol style="list-style-type: none"> 1. Understood the stress and coping styles 2. Acquired the sources of stress 3. Learned the techniques of stress management 4. To comprehend the implementation of stress management and counseling techniques
CPSY 306	Personality Development	2021	<ol style="list-style-type: none"> 1. Studied biological, psychological determinants 2. The students aware of socio cultural determinants & Soft Skills 3. The students acquainted with soft skills 4. They learned more on Soft skills
CPSY401	Applications of Counseling in Special	2021	<ol style="list-style-type: none"> 1. Understood how to handle the client with various problems and

	Areas		<ul style="list-style-type: none"> hailing into different age groups. 2. Learned how to handle the clients with specific problems 3. To attained what is career, personal, vocational and other applied areas of counseling 4. Gained how to organize Counseling programs to handle special concerns in Different social settings.
CPSY402	Therapeutic Approaches in Counseling–II(CC)	2021	<ul style="list-style-type: none"> 1. Understood the therapeutic approaches of counseling 2. Improve the major skills in therapeutic techniques 3. Gained specific methods involved in therapy 4. Adopted the different psycho therapeutic models of counseling.
CPSY403A	a. Counseling in Hospital Settings	2021	<ul style="list-style-type: none"> 1. Understood the concepts of Health Psychology in clinical setup. 2. Acquired the causes of Illness and Psychological Factors 3. Got a clinical picture about the role and scope of a Counselor in Hospital Settings 4. Learned the importance of Verbal and Non-verbal Communication in Patient care
CPSY403B	b. Counseling in Community Settings	2021	<ul style="list-style-type: none"> 1. Studied about the basics of Community Psychology 2. To comprehend the research methods to collect and analyze the data 3. Understood the role of supporting agencies to promote community guidance 4. Adopted different rehabilitation practices
CPSY403C	c. Counseling the Family	2021	<ul style="list-style-type: none"> 1. Understand the need and importance of family counseling. 2. Improved how to handle the family issues 3. To maximized use of tools in counseling 4. Learned the specific skills to handle family issues.
CPSY406	Life Skills (OE)	2021	<ul style="list-style-type: none"> 1. Learned the concept of life skills and its importance in relation to personality development of an individual. 2. They became aware of the components of life skills and the method of imparting knowledge of life skills.

			<ol style="list-style-type: none"> 3. The students have learned more on Life Skills in Specific 4. They acquainted with Self management skills
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42. Statistics

Course Code	Title of the Course	Years of Introduction	Course Outcomes
ST - 101	Linear Algebra	2021	<ol style="list-style-type: none"> 1. Students understood for estimation of elementary transformations in matrix and their solutions. 2. Students learnt about characteristic roots and vectors with numerical examples. They also know theoretical proofs of theorems. 3. Discriminate between diagonalizable and non-diagonalizable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms 4. Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in specific bases
ST - 102	Probability and Distributions	2021	<ol style="list-style-type: none"> 1. Students must have knowledge about random variables, expectations, sets and their properties and inequalities where ever necessary. 2. Students also know the weak law, strong law and central limit theorem and their importance 3. Students know about different continuous and discrete distributions and their properties. 4. They have awareness about central and non-central sampling distributions and order Statistics. Idea about simple, partial and multiple correlation coefficients.
ST – 103A	a. Sampling Techniques	2021	<ol style="list-style-type: none"> 1. Students learnt different sampling techniques of with replacement/ without replacement and Different sampling models. 2. Students studied non-Sampling errors and different remedies. 3. Implement Cluster sampling, Ratio and Regression estimation in real life problems 4. Apply unequal probability sampling designs viz. PPSWR, PPSWOR including Lahiri’s method and Murthy’s estimator for

			survey.
ST – 103B	b. Stochastic Process	2021	<ol style="list-style-type: none"> 1. Students understood stochastic processes, Markov chains, Poisson process, Renewal theory, Branching process, etc. 2. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. 3. Understand the consequences of the Intermediate value theorem for continuous function. 4. Know the chain rule and use it to find derivatives of composite functions and obtain expression for higher order derivatives of a function using the rule of differentiation. Solve integrals and evaluation of multiple integrals with numerical problems.
ST – 104A	Statistical 341 analysis using excel and SPSS	2021	<ol style="list-style-type: none"> 1. Students can learn how to enter the data MS-Excel. 2. Students can analyze the data in Excel and SPSS. 3. Students can learn how to transfer the data in one data Analysis application to Another. 4. Students can predict the future data using SPSS Procedures.
ST-104B	Python	2021	<ol style="list-style-type: none"> 1. Students have done Python Programming and their Object and Classes. 2. Students have understood I/O and Error Handling in Python. 3. Students can understand the looping problems. 4. Students can do basic EDA.
ST - 106	Practical-II (75 Practical + 25 Record)	2021	<ol style="list-style-type: none"> 1. Numerical problems related to Probability and Distribution Theory, are solved by executing programs on computers. 2. Calculate probabilities relevant to multivariate distributions, including marginal and conditional probabilities and the covariance of two random variables 3. Perform inferential statistical analysis through SPSS. 4. Compute descriptive statistics using SPSS.
ST - 201	Statistical Inference	2021	<ol style="list-style-type: none"> 1. Students know about point estimation, non-parametric models, Game theory, theorems and Proofs where ever necessary. 2. They can understand the concept of random sample from a distribution, sampling distribution of statistic, standard error of important estimates such as mean and proportions. 3. Students may gain the knowledge of testing of hypotheses (both large sample test and small sample test). 4. They can also calculate the problems related to point estimation and interval estimation.

ST - 202	Multivariate Analysis	2021	<ol style="list-style-type: none"> 1. Students learnt about importance of multivariate variables and their distributions 2. T^2, D^2, MANOVA models are understood and know it's importance. 3. Implement dimension reduction techniques using software on real life problems. 4. Classification analysis methods explained according to their classification algorithm.
ST - 203	(a) Linear Models and Applied Regression Analysis (b) Demography and Official Statistics	2021	<ol style="list-style-type: none"> 1. Students learnt about different linear and non-linear regression models and their appropriate computational procedures. 2. They know R^2, adjusted R^2 and C_p criteria for model selection. 3. They will get the knowledge of building and fitting linear regression models with software. 4. They also learn about the theory underlying point estimation, hypothesis and confidence intervals for linear regression models.
ST – 204 A	Design and Analysis of Experiments	2021	<ol style="list-style-type: none"> 1. Students learnt ANOVA, ANCOVA technique for one way and two-way classifications. Multiple comparisons tests using Tukey's, Duncans, Sheffe's and Dunnet's tests. 2. Students understood about Latin squares and their construction, missing plot technique etc. 3. Students explained about Incomplete Block Designs and their analysis, etc. 4. Understand the basic terms used in design of experiments by using appropriate experimental methods.
ST - 301	Econometric Methods	2021	<ol style="list-style-type: none"> 1. Students learnt heteroscedasticity, multicollinearity and autocorrelation and their estimation procedures. 2. Students understood about different lag models and simultaneous linear equations model with their estimation methods. 3. Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model. 4. Understand the assumptions upon which different econometric methods are based and their implications.
ST - 302	Operations Research-I	2021	<ol style="list-style-type: none"> 1. Students understood about Dual primal, Revised simplex methods. 2. Students learnt non-linear programming, integer programming, CPM, PERT, different models of games.

			<ol style="list-style-type: none"> 3. Students can think the real-life problems in the way of Linear Programming Problems and try to solve the problems in Mathematical Way. 4. Students can take a decision in real life by Using the Game Theory Techniques.
ST - 303	Biostatistics	2021	<ol style="list-style-type: none"> 1. Students learnt about biological assay, their distribution and theorems, dose response relationships, basic concepts of biological assay, estimation methods of gene frequencies, etc. 2. Describe single and multi-species population growth models. 3. Apply the concept of deterministic and stochastic models on simple and general epidemics. Understand linearization of dynamical systems with various dimensions
ST - 305	STATISTICAL ANALYSIS USING R	2021	<ol style="list-style-type: none"> 1. Students can manipulate the vectors, matrices, arrays, data frames and lists. 2. Students can work with the character data, factor data and dates. 3. Students get the results using data in R. 4. Students can work with different distributions and apply different tests for the data using R.
ST - 305 P	Practical-VI (75 Practical + 25 Record)	2021	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. 4. Students can understand how the statistics use in biological aspects
ST - 306 A	(a) Statistics for Biological and Earth Sciences	2021	<ol style="list-style-type: none"> 1. Students learnt about Graphs, measures of averages, measures of dispersion etc. 2. Students understood about Basic probability and important distributions with workout examples. 3. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests with examples. 4. Students used Advanced statistics tools with working illustrations.
ST - 306 B	(b) Statistics for Social and Behavioral Sciences	2021	<ol style="list-style-type: none"> 1. Students learnt about Graphs, measures of averages, measures of dispersion etc. 2. Students understood about basic probability and important

			<p>distributions with workout examples.</p> <ol style="list-style-type: none"> Students applied t, F, χ^2, ANOVA and ANCOVA and non-parametric tests and discussed with examples. Students used Advanced statistics tools with illustrations.
ST - 401	Time Series Analysis and Forecasting Methods	2021	<ol style="list-style-type: none"> Students understood Time series analysis with some important growth models and their fitting Students forecasting using regression, non-linear regression techniques, single, double, triple and adoptive exponential smoothing models. Students obtained knowledge on AR, MA, ARMA, ARIMA, models fitting, diagnostic checking, etc. Check and validate models with its residual analysis and diagnostic checking.
ST - 402	Operations Research-II	2021	<ol style="list-style-type: none"> To perform Dynamic programming and their applications and computation procedure with illustration. To discuss different Queuing models steady state solutions with examples. To explain Inventory models with and without shortages, S-splicy, EOQ estimation with simple examples To understand Replacement problems such as block and age replacement problems, individual and group replacement policies with examples.
ST – 403A	Advanced Econometric models	2021	<ol style="list-style-type: none"> Students understood GLM, SURE, nested and non-nested statistical models. Students learnt about specification error, adding, switching models. Students performed probit, logit models and their estimation. Students can understand the qualitative and limited dependent variable models.
ST-403B	Total Quality Management & Six sigma	2021	<ol style="list-style-type: none"> Students learn the Quality management importance in real life. Students directly know the organizing and planning for the Quality development. Students can understand the process managment and leadership to empower the teamwork. Students know the tools of quality management and their usage
ST-404 P	Practicals-VII	2021	<ol style="list-style-type: none"> Students solved Numerical problems related to semester –IV theory papers.

			<ol style="list-style-type: none"> 2. Students can understand how the statistics can play the role in the prediction of the future data. 3. Students can do the future predictions by using the existing data. 4. Students can do the research on the statistical data.
ST - 405	Student Project: Data Centre / Institutions / Companies and etc.,	2021	<ol style="list-style-type: none"> 1. Students collected data in different ways. 2. Students can prepare different questioner for collection of the data. 3. Students can learn data entry in particular software, analysis and interpretation. 4. Students learn and prepare the details reports on the projects.
ST - 406 A	(a) Business Analytics	2021	<ol style="list-style-type: none"> 1. Students learnt Graphs, measures of averages, measures of dispersion etc. 2. Students studied basic probability and important distributions with workout examples. 3. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests and discussed with examples. 4. Students performed advanced statistics tools for solving the problems.
ST-406B	(b) Survival Analysis	2021	<ol style="list-style-type: none"> 1. Students learnt about survival functions, their estimating methods, Distributions and their comparison for survival distributions. 2. Understand the elements of reliability, hazard function and its applications. 3. Understand the concept of censoring, life distributions and ageing classes. 4. Estimate nonparametric survival function of the data.

Applied Statistics

Course Code	Title of the Course	Years of Introduction	Course Outcomes
APST - 101	Linear Algebra	2021	<ol style="list-style-type: none"> 5. Students understood for estimation of elementary transformations in matrix and their solutions. 6. Students learnt about characteristic roots and vectors with numerical examples. They also know theoretical proofs of theorems. 7. Discriminate between diagonalizable and non-diagonalizable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms

			8. Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in specific bases
APST - 102	Probability and Distributions	2021	<ol style="list-style-type: none"> 5. Students must have knowledge about random variables, expectations, sets and their properties and inequalities where ever necessary. 6. Students also know the weak law, strong law and central limit theorem and their importance 7. Students know about different continuous and discrete distributions and their properties. 8. They have awareness about central and non-central sampling distributions and order Statistics. Idea about simple, partial and multiple correlation coefficients.
APST – 103A	a. Sampling Techniques	2021	<ol style="list-style-type: none"> 5. Students learnt different sampling techniques of with replacement/ without replacement and Different sampling models. 6. Students studied non-Sampling errors and different remedies. 7. Implement Cluster sampling, Ratio and Regression estimation in real life problems 8. Apply unequal probability sampling designs viz. PPSWR, PPSWOR including Lahiri’s method and Murthy’s estimator for survey.
APST – 103B	b. Stochastic Process	2021	<ol style="list-style-type: none"> 5. Students understoodstochastic processes, Markov chains, Poisson process, Renewal theory, Branching process, etc. 6. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. 7. Understand the consequences of the Intermediate value theorem for continuous function. 8. Know the chain rule and use it to find derivatives of composite functions and obtain expression for higher order derivatives of a function using the rule of differentiation. Solve integrals and evaluation of multiple integrals with numerical problems.
APST – 104A	Statistical analysis using excel and SPSS	2021	<ol style="list-style-type: none"> 5. Students can learn how to enter the data MS-Excel. 6. Students can analyze the data in Excel and SPSS. 7. Students can learn how to transfer the data in one data Analysis application to Another. 8. Students can predict the future data using SPSS Procedures.

APST-104B	Python	2021	<ol style="list-style-type: none"> 5. Students have done Python Programming and their Object and Classes. 6. Students have understood I/O and Error Handling in Python. 7. Students can understand the looping problems. 8. Students can do basic EDA.
APST - 106	Practical-II (75 Practical + 25 Record)	2021	<ol style="list-style-type: none"> 5. Numerical problems related to Probability and Distribution Theory, are solved by executing programs on computers. 6. Calculate probabilities relevant to multivariate distributions, including marginal and conditional probabilities and the covariance of two random variables 7. Perform inferential statistical analysis through SPSS. 8. Compute descriptive statistics using SPSS.
APST - 201	Statistical Inference	2021	<ol style="list-style-type: none"> 5. Students know about point estimation, non-parametric models, Game theory, theorems and Proofs where ever necessary. 6. They can understand the concept of random sample from a distribution, sampling distribution of statistic, standard error of important estimates such as mean and proportions. 7. Students may gain the knowledge of testing of hypotheses (both large sample test and small sample test). 8. They can also calculate the problems related to point estimation and interval estimation.
APST - 202	Multivariate Analysis	2021	<ol style="list-style-type: none"> 5. Students learnt about importance of multivariate variables and their distributions 6. T^2, D^2, MANOVA models are understood and know it's importance. 7. Implement dimension reduction techniques using software on real life problems. 8. Classification analysis methods explained according to their classification algorithm.
APST - 203	(a) Linear Models and Applied Regression Analysis (b) Demography and Official Statistics	2021	<ol style="list-style-type: none"> 5. Students learnt about different linear and non-linear regression models and their appropriate computational procedures. 6. They know R^2, adjusted R^2 and C_p criteria for model selection. 7. They will get the knowledge of building and fitting linear regression models with software. 8. They also learn about the theory underlying point estimation, hypothesis and confidence intervals for linear regression models.
APST – 204		2021	<ol style="list-style-type: none"> 5. Students learnt ANOVA, ANCOVA technique for one way and

A	Design and Analysis of Experiments		<p>two-way classifications. Multiple comparisons tests using Tukey's, Duncans, Sheffe's and Dunnet's tests.</p> <ol style="list-style-type: none"> Students understood about Latin squares and their construction, missing plot technique etc. Students explained about Incomplete Block Designs and their analysis, etc. Understand the basic terms used in design of experiments by using appropriate experimental methods.
APST - 301	Applied Econometrics	2021	<ol style="list-style-type: none"> Students learnt heteroscedasticity, multicollinearity and autocorrelation and their estimation procedures. Students understood about different lag models and simultaneous linear equations model with their estimation methods. Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model. Understand the assumptions upon which different econometric methods are based and their implications.
APST - 302	Applied Operations Research	2021	<ol style="list-style-type: none"> Students understood about Dual primal, Revised simplex methods. Students learnt non-linear programming, integer programming, CPM, PERT, different models of games. Students can think the real-life problems in the way of Linear Programming Problems and try to solve the problems in Mathematical Way. Students can take a decision in real life by Using the Game Theory Techniques.
APST – 303	Practical- V (75 Practical +25 Record)	2021	<ol style="list-style-type: none"> Students can understand the Statical Methos in Economical Views. Students solved the Numerical problems related to operations research. Students Understand the Life Tables in Demography. Students can understand how the statistics use in biological aspects.
APST - 304	Advanced Bio-Statistics	2021	<ol style="list-style-type: none"> Students learnt about biological assay, their distribution and theorems, dose response relationships, basic concepts of biological assay, estimation methods of gene frequencies, etc. Describe single and multi-species population growth models. Apply the concept of deterministic and stochastic models on simple and general epidemics.

			4. Understand linearization of dynamical systems with various dimensions.
APST - 305	Practical-VI (75 Practical + 25 Record)	2021	<ol style="list-style-type: none"> 1. Students can manipulate the vectors, matrices, arrays, data frames and lists. 2. Students can work with the character data, factor data and dates. 3. Students get the results using data in R. 4. Students can work with different distributions and apply different tests for the data using R.
APST - 306	(a) Statistics for Biological and Earth Sciences (b) Statistics for Social and Behavioral Sciences	2021	<p>A. Statistics for Biological and Earth Sciences</p> <ol style="list-style-type: none"> 1. Students learnt about Graphs, measures of averages, measures of dispersion etc. 2. Students studied Basic probability and important distributions with workout examples. 3. Students performed t, F, χ^2, ANOVA and ANCOVA and non-parametric tests with examples. 4. Students studied Advanced statistics tools with illustrations. <p>B. Statistics for Social and Behavioral Sciences</p> <ol style="list-style-type: none"> 1. Students learnt Graphs, measures of averages, measures of dispersion etc. 2. Students understood about Basic probability and important distributions and studied with workout examples. 3. Students performed t, F, χ^2, ANOVA and ANCOVA and non-parametric tests and discussed with examples. 4. Students learnt about Advanced statistics tools with working illustration
APST - 401	Applied Forecasting Methods	2021	<ol style="list-style-type: none"> 1. Students understood Time series analysis with some important growth models and their fitting 2. Students forecasting using regression, non-linear regression techniques, single, double, triple and adoptive exponential smoothing models. 3. Students obtained knowledge on AR, MA, ARMA, ARIMA, models fitting, diagnostic checking, etc.

			Check and validate models with its residual analysis and diagnostic checking.
APST - 402	Reliability and Survival Analysis	2021	<ol style="list-style-type: none"> 1. Students learnt about and survival analysis with their related distributions, relationships, non-parametric methods for computing survival analysis. 2. Estimate nonparametric survival function of the data. 3. Explain test of exponentiality against nonparametric classes, two sample problems. <p>Understand the elements of reliability, hazard function and its applications.</p>
APST – 403A	Statistics for research, industry and Communitydevelopment	2021	<ol style="list-style-type: none"> 1. Students have done Simulation models, response surface models, demand analysis, social survey and their related measures. 2. Students can understand the basic of research blooms taxonomy of learning levels. 3. Find the topic from current research in statistics education. 4. Students can apply the tools in design, research and developments.
APST-403B	Advanced econometric models	2021	<ol style="list-style-type: none"> 1. Students understood GLM, SURE, nested and non-nested statistical models. 2. Students learnt about specification error, adding, switching models. 3. Students performed Probit, logit models and their estimation. 4. Students can identify qualitative and limited dependent variable models
APST – 404	Practical-VII	2021	<ol style="list-style-type: none"> 1. Students solved Numerical problems related to semester –IV theory papers. 2. Students can understand how the statistics can play the role in the prediction of the future data. 3. Students can do the future predictions by using the existing data. <p>Students can do the research on the statistical data.</p>
APST - 405 A	Student Project: Data Centre / Institutions / Companies and etc.,	2021	<ol style="list-style-type: none"> 1. Students collected data in different ways. 2. Students can prepare different questioner for collection of the data. 3. Students can learn data entry in particular software, analysis and interpretation. 4. Students learn and prepare the details reports on the projects.
APST-405B	Statistical Quality Control	2021	<ol style="list-style-type: none"> 1. Students with their knowledge in control charts.

			<ol style="list-style-type: none"> Students with their knowledge in Concept of Six sigma and its relationship with process capability. Student have awareness about OC and ARL of Shewart's control charts Students have awareness about Total Quality Management.
APST - 406 A	(a) Statistics for Marketing Research	2021	<ol style="list-style-type: none"> Students learnt about Research design and how to frame questionnaire etc. Statistics relating to research like univariate test like Z, t, F, ANOVA, CRD, RBD and LSD are done. Multivariate statistical techniques like factor analysis, dissemination analysis and cluster analysis are used. Students can understand how the marketing is happening in the real life.
APST - 406 B	(b) Statistical Analysis Using SPSS	2021	<ol style="list-style-type: none"> Able to create and manipulate vectors, matrices, arrays, data frames and lists. Should be able to work with character data, factor data and dates. Able to write scripts and function in R and read data from .csv files, EXCEL files and SPSS files. <p>Able to use built-in functions to answer questions relating to probability distributions, parametric and non-parametric hypothesis testing, correlation and regression analysis, and one-way and two-way ANOVA</p>

43. Virology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	VIR-101	Biological Chemistry	2021	<ul style="list-style-type: none"> To impart analytical knowledge in Biochemistry, to learn the basic concepts of chemical processes of living organisms and the classification, structure, properties and functions of biomolecules of life (carbohydrates and lipids), To learn, the classification, structure, properties and functions of , proteins classification and mechanism of action of enzymes and enzyme kinetics.

				<ul style="list-style-type: none"> - To learn, the classification, structure, properties and functions of nucleic acids, hormones, growth regulators and importance of vitamins and - To learn about the principles of thermodynamics and metabolism of nucleic acids, lipids, proteins and carbohydrates.
2	VIR-102	Analytical Techniques	2021	<ul style="list-style-type: none"> - To understand the approaches involved in characterization and concentration of biomolecules and to train students in adopting various techniques involved in biological research such as microscopic, - To understand the approaches involved in chromatographic, centrifugal, and electrophoretic techniques. - To learn about various radioisotopes, spectroscopy and cell counting techniques that are used for characterization of biomolecules and - To learn about basic concepts of biostatistics such as measures of central tendency and dispersion, correlation and regression analysis, probability distribution and tests of significance.
3	VIR-103A (Or)	General Microbiology (Or)	2021	<ul style="list-style-type: none"> - Understand the origin, evolution, different groups and importance of microorganisms and learn the types, principles and applications of microscopy, morphology, and structure of bacteria. - Learn the basic concepts of media preparation, isolation, cultivation, enumeration, growth measurement, maintenance, and preservation methods of microorganisms. - Explain the general criteria for microbial classification, general characteristics of microorganisms, mechanism of nutrient transport in microbes and strategies used for control of microorganisms. - Describe the general characteristics, structure, reproduction of important fungi, algae and protozoan parasites.
5	VIR-103B	Microbial Physiology and Metabolism	2021	<ul style="list-style-type: none"> - Understand the fundamental aspects of nutrition and growth requirements and the mechanism of transport of nutrients in different groups of microorganisms and their importance - Learn the basic concepts of microbial growth characteristics metabolism of growth and microbial photosynthesis - Explain the general criteria for microbial metabolism of Carbohydrates, Aerobic and Anaerobic respiration

				<ul style="list-style-type: none"> - Describe the lipid, protein, nucleotide metabolism of microorganism
6	VIR-104A (Or)	General Virology (Or)	2021	<ul style="list-style-type: none"> - Learn the discovery, nature, origin and evolution of viruses and the physical, biochemical, and biological properties of viruses, criteria used for nomenclature and classification of bacteria, plant and animal viruses. - Describe the methods used for isolation, cultivation, and purification of viruses and criteria of purity. - Define biological, physical, biochemical, and serological methods used for quantitation of viruses, major characteristics of important plant and animal virus families and biology and applications of major RNA and DNA viruses of insects. - Understand the biology of major bacteriophages, algal and fungal viruses, subviral agents and importance of viruses in human welfare with suitable examples.
7	VIR-104B	Enzyme Technology	2021	<ul style="list-style-type: none"> - Acquire knowledge on Nomenclature and classification; general types properties and Kinetics of Enzymes - Learn the the properties and functions of viral enzymes, and mechanism of action of enzymes. - Learn the enzyme immobilization and Biosensors and their applications in industry, healthcare and environment. - : Learn the Applications of Enzymes in food processing, textile and pharmaceutical industries; Catalytic enzymes
8	VR-105A (Or)	Biological Chemistry & General Microbiology (Or)	2021	<ul style="list-style-type: none"> - Learn to calculate normality, molarity, molecular weight and percentage of chemical substances and qualitative and quantitative estimation of major biomolecules such as proteins, carbohydrates, lipids and nucleic acids. - Know how to isolate and check the activity of enzymes from various sources. - Define laboratory safety measures that need to be followed in Virology and Microbiology laboratories and know how to use different sterilization methods and preparation of media. - Acquire the practical skills to use cultivation, staining and characterization methods for different microorganisms and to check their stability under various conditions.

9	VR-105B	Biological Chemistry & Microbial Physiology and Metabolism	2021	<ul style="list-style-type: none"> - Learn to calculate normality, molarity, molecular weight and percentage of chemical substances and qualitative and quantitative estimation of major biomolecules such as proteins, carbohydrates, lipids and nucleic acids. - Knowhow to isolate and check the activity of enzymes from various sources. - Acquire the practical skills to usecultivation, staining and characterization methods for different microorganisms and to check their stability under various conditions. - Define the various methods of optimization of cultural conditions for bacterial growth and antibiotic assay methods
10	VIR-106A (Or)	Analytical Techniques & General Virology (or)	2021	<ul style="list-style-type: none"> - Learn to useultrafiltration, chromatography, and electrophoresis techniquesfor isolation and characterization of biomolecules. - Acquire the skills to usespectroscopic and centrifugal methods for characterization of biomolecules - Learn to isolate bacteriophages from different sources and cultivate viruses in embryonated eggs and plants. - Demonstrate the mechanical, aphid and graft transmission of plant viruses and methods used to check the stability of viruses and determine the effect of virus infection on plants through chlorophyll estimation.
11	VIR-106B	Analytical Techniques & Enzyme Technology	2021	<ul style="list-style-type: none"> - Learn to useultrafiltration, chromatography, and electrophoresis techniquesfor isolation and characterization of biomolecules. - Acquire the skills to usespectroscopic and centrifugal methods for characterization of biomolecules. - Learn to estimate the blood sugar, urea. quantitative and qualitative assay of enzymes and their kinetics - Knowhow to isolate and check the activity of enzymes from various sources.
12	VIR-107	Human values and professional ethics– i	2021	<ul style="list-style-type: none"> - To enable the students to imbibe and internalize the moral values and ethical principles - To learn ethics moral and social values and ethical behavior in the personal

				<p>and Professional lives.</p> <ul style="list-style-type: none"> - To learn the rights and responsibilities and to appreciate the rights of others and to create awareness on religious values and other good acts and facts of life. - To acquire knowledge about the important facts of Bhagavad Gita, values hidden in religions, religious tolerance and aware of crime, and punishment theories
13	VIR-201	Cell Biology and Tissue Culture	2021	<ul style="list-style-type: none"> - To understand the structure and contents of prokaryotic and eukaryotic cells, - To understand general principles and pathways of cell communication and cell signaling. - To describe the concepts and methodologies of plant tissue cultures. - To describe the concepts and methodologies of animal tissue and organ cultures, cell counting and introduction to stem cell cultures
14	VIR-202	Microbial Genetics and Molecular Biology	2021	<ul style="list-style-type: none"> - Learn the terminology of molecular genetics, distinguish the prokaryotic and eukaryotic genome organization and describe modern concept of genes, plasmids, and mobile genetic elements. - Understand the gene transfer and mapping mechanisms in bacteria, genetics of viruses and learn about requirements and mechanism of DNA replication. - Acquire the knowledge about mechanism of DNA damage and repair, concept of mutations and their importance, requirements, and mechanism of transcription. - Understand the requirements and processes of translation, compare the levels of regulation of gene expression in prokaryotes and eukaryotes and learn about gene silencing mechanisms.
15	VIR-203A (Or)	Recombinant DNA Technology (Or)	2021	<ul style="list-style-type: none"> - To learn the scope, importance of genetic engineering, basic steps of gene cloning and the role of enzymes, vectors, oligonucleotides, and hosts in gene manipulation. - To learn basic and advanced tools and techniques, approaches and strategies used in gene manipulation in prokaryotic and eukaryotic systems - To learn the gene cloning strategies and learn the concepts and applications of genomics, proteomics, transcriptomics, and introduction to metagenomics, viromics. - To understand the strategies used for gene expression in heterologous hosts and applications/implications of genetic engineering in agriculture, medicine,

				industry and biology.
16	VIR-203B	Biostatistics and Bioinformatics	2021	<ul style="list-style-type: none"> - Understand basic concepts of statistics, construction of histogram, normal distribution, mean, median and standard deviation, comparison of means and variances, examples of proportion and count data. - :Learn the concepts of analysis of variance, correlation and regression and applications of statistical parameters for biological assays. - Learn basics of personal computer and its components, windows operating system, Microsoft office-2000, basics of internet browsing of biological data, computer networking and information networks. - Acquire knowledge about databases and tools, sequence analysis, phylogenetic analysis using bioinformatics tools and predictive methods using nucleotide and protein databases -
17	VIR-204A (Or)	Immunology (Or)	2021	<ol style="list-style-type: none"> 1. To compare innate and adaptive immunity and to learn about various components of immune system, 2. To learn about antigens, antibodies, <i>in vitro</i> and <i>in vivo</i> antigen and antibody interactions and immune effector mechanisms. 3. To elucidate the mechanism of humoral and cell mediated immune responses, MHCs, hypersensitivity reactions. 4. To acquire knowledge on autoimmune and immunodeficiency disorders, transplantation and transfusion immunology and concepts and applications of conventional and modern vaccines.
18	VIR-204B	Food and Environmental Biotechnology	2021	<ul style="list-style-type: none"> - Understand the the role of microbes in food ,neutraceuticals organic foods and functional foods - Learn the Importance of microorganisms in food production; Probiotics and prebiotics Food quality assurance and food laws - Describe the Food quality assurance and use of biosensors, biofilters, biofuel cells - Learn the Biosorption of heavy metals, GEMs and their products, Concepts and biosafety
19	VIR-205A	Cell Biology and Tissue culture &	2021	<ul style="list-style-type: none"> - Learn the safety practices and precautions to be followed in setting up molecular biology laboratory with ribonuclease free environment.

	(Or)	Recombinant DNA Technology (Or)		<ul style="list-style-type: none"> - Isolate cells, DNA and RNA from plant and animal tissues, demonstrate mitosis, plasmid curing, replica plate and gradient plate methods. - Acquire practical skills to isolate plasmids, restriction enzyme digestion of DNA, recovery of DNA from gels, transformation of bacteria and demonstrate the southern and dot blot preparation for hybridization. - Solve the problems related to molecular biology and recombinant DNA technology and learn the basic bioinformatic tools that are important for DNA analysis
20	VIR-205B	Cell Biology and Tissue culture & Biostatistics and Bioinformatics	2021	<ul style="list-style-type: none"> - Learn the safety practices and precautions to be followed in setting up molecular biology laboratory with ribonuclease free environment. - Isolate cells, DNA and RNA from plant and animal tissues, demonstrate mitosis, plasmid curing, replica plate and gradient plate methods. - Learn how to use MS office and create, edit tables in MS word and to develop knowledge to do simple statistics with Excel, to create statistical graphs and spread sheets in Excel for biological applications - Use internet, web tools, databases, and search engines for designing, planning, and executing biological research experiments or investigations. Analyze viral genome sequences using programs like Bio Edit and learn to use NCBI, EMBL for nucleic acid/protein analysis and phylogenetic tree construction. -
21	VIR-206A (Or)	Microbial Genetics and Molecular Biology & Immunology (Or)	2021	<ul style="list-style-type: none"> - Learn the safety practices and precautions to be followed in setting up Cell and Molecular Biology laboratory with ribonuclease free environment. - Isolate and estimate DNA and RNA from microbial, plant and animal tissues and demonstrate curing of plasmids, replica plating techniques, conjugation in bacteria, Ames test, induction of mutations in bacteria by physical/chemical agents, isolation of microbial mutants by gradient plate method. - Identify of primary and secondary lymphoid organs in virtual animal model and illustrate basic immunology techniques such as counting of RBC and WBC, estimation of hemoglobin, identification of the blood groups and Rh. - Demonstrate antigen-antibody interactions by conducting <i>in vitro</i> serological tests such as immunodiffusion and immune-electrophoresis, DAC-ELISA, Dot-ELISA and western blotting and apply this practical oriented knowledge in Cell Biology and Immunology to foster employability in private industries, higher education in premier institutes

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22	VIR-206B	Microbial Genetics and Molecular Biology & Food and Environmental Biotechnology	2021	<ul style="list-style-type: none"> - Learn the safety practices and precautions to be followed in setting up Cell and Molecular Biology laboratory with ribonuclease free environment. - Isolate and estimate DNA and RNA from microbial, plant and animal tissues and demonstrate curing of plasmids.replica plating techniques, conjugation in bacteria, Ames test, induction of mutations in bacteria by physical/chemical agents, isolation of microbial mutants by gradient plate method. - Learn preparation of fermented food products, analyse the quality of water, milk and food ,vitamins - :Acquire the practical skills in the production of bofertilisers and biopesticides and biodegradation of pesticides
23	VIR-301	Plant Virology	2021	<ul style="list-style-type: none"> - Understand the induction of plant virus diseases, virus-host interactions and movement strategies. - Learn the vector and non-vector modes of plant virus transmission, virus-vector relationships and molecular mechanisms involved in virus vector interactions and the approaches used for identification and characterization of the viruses and virus strains. - Acquire the knowledge on plant virus spread and survival in nature and approaches used to detect plant viruses and diseases.
24	VIR-302	Plant Virus Diseases	2021	<ul style="list-style-type: none"> - Describe the incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the major virus diseases of cereals, millets and oil seed crops. - Learn the incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the major virus diseases of vegetable and tuber crops. - Acquire the knowledge of incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the major virus diseases of food legume and fruit crops. - Discuss the incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the major virus diseases of cash, spice, beverage, flowering and foliage ornamental crops
25	VIR-	Molecular	2021	<ul style="list-style-type: none"> - Acquire knowledge about principles of virus architecture and effect of

	303A (Or)	Virology		<p>physical and chemical agents on viruses.</p> <ul style="list-style-type: none"> - Learn about structure and diversity of viral genomes, general concepts of replication of viruses and expression and replication of DNA viruses - Learn about expression and replication of different RNA viruses and subviral agents such as viroids, Satellite viruses, defective interfering particles and prions. - Describe the regulation of viral genome expression and concepts/molecular mechanisms of transformation of cells by tumor viruses and therapeutic interventions and oncolytic viruses. -
26	VIR-303B	Tumor Virology	2021	<ul style="list-style-type: none"> - Acquire knowledge about the basic aspects of tumors, distinguish normal and transformed cells and describe the role of oncogenes and tumor suppressor genes in causing cancers. - Understand the role and mechanism of carcinogens in inducing carcinogenesis and molecular viral mechanisms of transformation and tumorigenesis. - Describe the types of RNA and DNA viruses that are causing tumors and viral mechanisms for cell transformation. - Learn the concepts and mechanisms of transformation, tumor response to tumors and prophylactic and therapeutic interventions used for management of tumors.
27	VIR-304A (Or)	Plant Virology and Virus Diseases & Molecular Virology	2021	<ul style="list-style-type: none"> - Identify major virus diseases of local economically important crop plants and weeds through theory exercises, local field surveys, agricultural research station visits. Determine and compare the effect of virus on cell size, chloroplast number, total carbohydrates, proteins, and lipids with healthy counterparts. - Detect unknown viruses through ELISA and PCR (theory exercise and practical) and demonstrate plant virus transmission by seed and vegetative propagules. Identify local plant virus vectors, determine virus disease

				<p>incidence and progress curves through local field visits.</p> <ul style="list-style-type: none"> - Acquire the skills to use the techniques involving purification of viruses such as maintenance of virus cultures on propagation hosts, check the quality and quantity of viruses using spectroscopy or transmission electron microscopy. Isolate virus coat proteins and determine its size and molecular weight through SDS-PAGE. - Isolate virus nucleic acids (dsRNA, RNA and DNA) and determine its size and molecular weight through agarose gel electrophoresis. Determine the stability of virus by studying effect of physical and chemical agents on virus inactivation
28	VIR-304B	Plant Virology and Virus Diseases & Tumor Virology	2021	<ul style="list-style-type: none"> - Identify major virus diseases of local economically important crop plants and weeds through theory exercises, local field surveys, agricultural research station visits. Determine and compare the effect of virus on cell size, chloroplast number, total carbohydrates, proteins, and lipids with healthy counterparts. - Detect unknown viruses through ELISA and PCR (theory exercise and practical) and demonstrate plant virus transmission by seed and vegetative propagules. Identify local plant virus vectors, determine virus disease incidence and progress curves through local field visits. - Acquire skills to detect carcinogens and mutagens using standard tests such as Ames test. Distinguish transformed and normal cell lines and determine the anticancer property of biologically active compounds. - Design and execute PCR and other point of care methods using commercial kits for detection of tumor viruses (HCV, HIV). Perform cultivation of poultry tumor viruses in cell cultures and acquiring the knowledge on histopathology of animal tumor viruses.
29	VIR-305A	Theory- Molecular Techniques	2021	<ul style="list-style-type: none"> - Explain the scope, importance of virology laboratory, lab equipment and laboratory biosafety health education and health communication. - Describe the basic methods and advanced tools and techniques, approaches and strategies used in virology, and their principles and applications. - Describe the the advanced molecular tools used in virology and to learn the concepts and applications of genomics, proteomics, transcriptomics, and

				<p>introduction to metagenomics, viromics.</p> <ul style="list-style-type: none"> - Understand the strategies used for drug design, artificial intelligence and modern vaccinology and applications in medicine
30	VIR-305B	Practical-Molecular Techniques	2021	<ul style="list-style-type: none"> - Understand the biosafety, biosecurity, and ethical guidelines to be followed in the Molecular Virology laboratory. - Learn the Methods related to collection of clinical material for culture-urine, blood, throat swab, faeces, body fluids - Acquire practical skills to isolate plasmids from bacteria, restriction enzyme digestion of recombinant plasmid DNA, recovery of DNA from gels, transformation of bacteria and demonstrate the preparation of southern and dot blots for hybridization. - PCR amplification of coat protein gene and analysis by agarose gel electrophoresis, Isolation of metal nanoparticles and antiviral compounds from a plant. Purification and characterization of nanoparticles using ultracentrifugation, chromatography, FTIR, SEM, XRD and NMR.
31	VIR-306A (Or)	Basic Virology	2021	<ul style="list-style-type: none"> - To understand the history, properties, nomenclature and classification of viruses and development of virology and - 2. To learn about methods used for isolation, cultivation, and purification of viruses. - 3..To acquire knowledge about the methods used for quantitation of viruses and sub viral agents - To acquire knowledge about Laboratory Biosafety Management of plant, animal and human viruses
32	VIR-306B	Agricultural, Animal and Human Viruses	2021	<ul style="list-style-type: none"> - To acquire knowledge about the origin and evolution of the viruses and properties and cultivation of viruses - To learn about important animal viruses and veterinary epidemiology. - To learn about important plant and human viruses - To learn about important plant and human virus diagnostic and management methods
33	VIR-	Communicative	2021	<ul style="list-style-type: none"> - Acquire the Oral and Aural Skills, Writing Skills, Job Skills and Soft Skills

	307	english and fundamentals of computers		<ul style="list-style-type: none"> - Understand the Basics of personal computer and its components Windows Operating System-2010 Microsoft Office- - Learn to practice MS-Word, MS-Excel, MS-PowerPoint - Increase the awareness Introduction to InternetE-mailNetworking of Computers overview of International and Indian networksInformation NetworksWWW, HTML, URLs, EMB net, NCBI net, Virtual tourism
34	VIR-401	Animal and Human Virology	2021	<ul style="list-style-type: none"> - Understand the virus host interactions, host defense mechanisms against viruses and innate and adaptive immune responses to viruses, molecular mechanisms of viral pathogenesis with respect to polio, rotavirus, and cytomegalovirus. - Describe the various modes of vertical and horizontal transmission of animal and human viruses, zoonotic virus infections, mechanism of virus persistence, routes of entry and mechanism of virus spread in the body. - Learn about the epidemiological concepts of virus diseases, measures of disease occurrence, prevalence, and mapping, determinants of disease, factors affecting virus ecology and epidemiology of animal and human viruses. - Acquire knowledge on virus disease surveillance, strategies of virus maintenance in communities, principles of virus disease survey, methods of prevention and control of animal and human viruses.
35	VIR-402	Animal and Human Virus Diseases	2021	<ul style="list-style-type: none"> - Acquire the knowledge about etiology, transmission, clinical manifestations, diagnosis, prevention, and control of major RNA viruses of <i>Picornaviridae</i>, <i>Caliciviridae</i>, <i>Coronaviridae</i>, <i>Astroviridae</i>, <i>Matonaviridae</i>, <i>Togaviridae</i>, <i>Flaviridae</i>, <i>Reoviridae</i>and<i>Birnaviridae</i>. - CO2: Learn the etiology, transmission, clinical manifestations, diagnosis, prevention, and control of important RNA viruses of<i>Orthomyxoviridae</i>, <i>Paramyxoviridae</i>, <i>Rhabdoviridae</i>, <i>Filoviridae</i>, <i>Bunyaviridae</i>, <i>Arenaviridae</i>and<i>Retroviridae</i>. - Describe the etiology, transmission, clinical manifestations, diagnosis, prevention, and control of important DNA viruses of <i>Circoviridae</i>, <i>Parvoviridae</i>, <i>Poxviridae</i>, <i>Herpesviridae</i>, <i>Papillomaviridae</i>and<i>Adenoviridae</i>.

				<ul style="list-style-type: none"> - Develop the knowledge about etiology, transmission, clinical manifestations, diagnosis, prevention, and control of important DNA viruses belonging to <i>Hepadnaviridae</i>, <i>Asfaviridae</i>, <i>Iridoviridae</i>, <i>Polydnaviridae</i> and <i>polyomaviridae</i> and understand the prion diseases, biology, prevention, and management of major viruses of silkworm, poultry, fish and prawn, emerging and reemerging virus diseases. -
36	VIR-403A	Applied Virology (Or)	2021	<ul style="list-style-type: none"> - Understand the basic concepts, types, requirements and methodologies of plant/animal cell and tissue cultures used for cultivation of plant and animal viruses. - Learn the production of recombinant DNA technology-based antibodies and vaccines to viruses and the concepts and methods of production of virus resistant/tolerant crops and virus-based biopesticides. - Acquire knowledge about common virus infections caused to human beings through vector and non-vector borne modes and basic principles of biosafety, biosecurity, and ethical/regulatory issues in Virology and basics in Intellectual Property Rights (IPR). - Understand the utilization of viruses as viral genes/sequences as unique genetic resources, novel enzymes, gene expression activators and silencers, gene delivery systems, epitope display platforms and model systems in understanding the replication of nucleic acids and regulation of gene expression strategies and cancer biology, phage display and therapy technologies and viruses as biological weapons.
37	VIR-403B	Virus-based Biotechnology	2021	<ul style="list-style-type: none"> - Understand the basic concepts, types and methodologies of plant / animal cell and tissue cultures and exploitation of viruses as viral genes/sequences as unique genetic resources, novel enzymes, gene expression activators and silencers, gene delivery systems, epitope display platforms and model systems in understanding the replication of nucleic acids and regulation of gene expression strategies and cancer biology. - Describe the exploitation of bacteriophages for peptide display and therapy, discuss the virus-based biopesticides and viruses as biological warfare, bio-crime and bioterrorism agents.

				<ul style="list-style-type: none"> - Learn the concepts and methods of production of recombinant DNA technology-based antibodies and vaccines to viruses and understand the principles and applications of virus-based nanoparticles (virus nanoparticles and virus-like particles, VNPs and VLPs) in biotechnology. - Describe the concepts and methods of production of virus resistant/tolerant crops and guidelines of testing and releasing the transgenic lines in India and learn about biosafety, biosecurity guidelines to be followed to conduct virus-related research and discuss the ethical and regulatory issues in virus-related research and basic concepts of IPR and Indian patenting system.
38	VIR-404A	Animal and Human Virology and Virus Diseases & Applied Virology (Or)	2021	<ul style="list-style-type: none"> - Acquire the skills to prepare the cell cultures and embryonated eggs for cultivation of plant, animal and human viruses and to isolate and quantitate viruses. - Learn the methods to detect plant and animal viruses and able to analyze various types of results obtained from serological and molecular viral diagnostic methods. - Apply the skills acquired to prepare NPV as biopesticides and virus-based nanoparticles and their isolation using analytical methods. - Participate in extension activities and field, poultry, agriculture research station and aqua form visits.
39	VIR-404B	Animal and Human Virology and Virus Diseases & Virus-based Biotechnology	2021	<ul style="list-style-type: none"> - Understand the biosafety, biosecurity and ethical guidelines to be followed in the molecular virology laboratory. - Learn the technologies related to preparation of media for cell/tissue cultures, preparation of cell cultures/embryonated eggs for virus cultivation and isolation and quantitation of viruses using differential centrifugation and symptomatology/spectroscopy, respectively. - Develop skills to test the animal, human and plant viruses using serological and molecular tests and kit-based methods. - Acquire knowledge on virus-based nanotechnology protocols, virus epidemiology by doing extension activities and visiting field, poultry, agriculture research station and aqua forms. -
40	VIR-	Theory-Industrial	2021	<ul style="list-style-type: none"> - Understand the cultivation of industrially important organisms Strain

	405A	Biotechnology		<p>improvement methods and bioreactors</p> <ul style="list-style-type: none"> - Learn the basic concepts of the types of fermentation processes and to learn about important Bioprocess control measurements - Describe the Downstream processing and its industrial applications, Quality assurance techniques and its importance in marketing. - Learn the industrial production of enzymes, beverages, alcohol and single cell proteins -
41	VIR-405B	<p>Practical-Industrial Biotechnology</p> <p>(Or)</p>	2021	<ul style="list-style-type: none"> - Acquire the practical skills to use in cultivation, and screening of the industrially important microorganisms from different sources for the production of enzymes and organic acids. - Acquire the practical skills to use cultivation, and screening of the industrially important microorganisms from different sources for the production of wine and alcohol. - Learn the Quality testing of milk, quantitative analysis of lactic acid and Effect of heavy metals on bacteria. - visit to small scale industries to learn the processes in the production of industrially important products
42	VIR-405C	Project work related to Virology	2021	<ul style="list-style-type: none"> - Acquire basic understanding of virus taxonomy and virus properties and learn the concept of transmission, replication, cultivation and characterization of viruses. - Learn to collect, preserve the virus samples and detect the viruses by using biological, serological and molecular methods, good microbiological and laboratory practices used in the clinical laboratories. - Understand the properties, transmission, pathogenesis, epidemiology, diagnosis and detection of clinically important virus diseases. - Learn about the approaches used for prevention and control of clinically

				important infectious virus diseases. -
43	VIR-406A	Clinical Virology (Or)	2021	<ul style="list-style-type: none"> - Acquire basic understanding of virus taxonomy and virus properties and learn the concept of transmission, replication, cultivation and characterization of viruses. - Learn to collect, preserve the virus samples and detect the viruses by using biological, serological and molecular methods, good microbiological and laboratory practices used in the clinical laboratories. - Understand the properties, transmission, pathogenesis, epidemiology, diagnosis and detection of clinically important virus diseases. - Learn about the approaches used for prevention and control of clinically important infectious virus diseases.
44	VIR-406B	Emerging and Reemerging Viruses	2021	<ul style="list-style-type: none"> - Understand the evolution, biology, epidemiology, and emergence of infectious virus diseases, biology of emerging infectious diseases, zoonotic infections - Learn about the biology, clinical symptoms, epidemiology, diagnosis, and control of viruses causing AIDS and SARS and host defense mechanisms against infectious virus diseases. - Describe the biology, clinical symptoms, epidemiology, diagnosis, and control of vector borne emerging infectious viral diseases. - Acquire knowledge on impact of social and environmental change on emergence of viruses, vector control and antiviral therapies, vaccines, public health measures and bioterrorism. -
45	VIR-407:	Research aptitude and entrepreneurship	2021	<ul style="list-style-type: none"> - Aware of the Steps of Research; Methods of Research and communication skills - Learn the Data Interpretation Ethical Issues of Data Reporting and for Authenticity. Preparation of research proposal - Acquire the knowledge about the importance Information and Communication Technology (ICT) and Role of Entrepreneurship in Economic Development; Start-ups. - Acquire knowledge about the Idea Generation and Project Formulation, Institutions Supporting and Taxation Benefits

44. Zoology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ZOO-101	Invertebrata & Chordata	2021	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respect to their habit and habitat.</p> <p>iii. In depth understanding of Anatomical features of Integumentary, Circulatory, Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.</p>
2	ZOO-102	Metabolic Regulation & Cell Function	2021	<p>i. The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p>
3	ZOO-103A	Genetics & Evolution	2021	<p>i. Students will appreciate the concept of epigenetics as a key mechanism of regulation of gene expression steering development and cell fate that can ultimately be affected in disease condition</p> <p>ii. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations, Natural Selection and Genetic drift.</p> <p>iv. Understood the concepts of Micro, Macro evolution speciation</p>

				categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.
4	ZOO-103B	Endocrinology	2021	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic pathways.</p> <p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
5	ZOO-104A	Tools & Techniques	2021	<p>i. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>ii. Identify and describe the different equipment and tools used in a biology laboratory.</p> <p>iii. Correctly operate different laboratory instruments.</p> <p>iv. Correctly operate different types of microscopes.</p> <p>v. Prepare tissue for section cutting and correctly operate a microtome.</p>
6	ZOO-104B	Genetic Engineering	2021	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p> <p>ii. Students will be able to perform basic genetic engineering experiments at the end of course.</p> <p>iii. Students will acquire knowledge of advances in biotechnology-healthcare, agriculture and environment cleanup via recombinant DNA technology.</p>
7	ZOO-105P	Practical-I Invertebrata & Chordata and Genetics & Evolution/ Endocrinology	2021	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respect to their habit and habitat.</p> <p>iii. Understanding the comparative aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in taxonomy related research and job opportunities.</p>

				<p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p> <p>vii. Understood that the four propositions underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
8	ZOO-106P	Practical-II Metabolic Regulation & Cell Function and Tools & Techniques/ Genetic Engineering	2021	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight into biological processes.</p> <p>iv. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>v. Students would gain basic knowledge of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study and understanding of life processes.</p> <p>vi. Students will become familiar with the tools and techniques of genetic engineering DNA manipulation enzymes, genome and transcriptome analysis and manipulation tools, gene expression regulation, production and characterization of recombinant proteins.</p>
9	ZOO-107	Audit Course Human Values and Professional Ethics-I	2021	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting</p>

				<p>good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
10	ZOO-201	Molecular Biology	2021	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p> <p>ii. Students world gain expertise in understanding the complex molecular mechanisms occurring in cell and the applications of molecular technologies for betterment of life.</p> <p>iii. Understand and our apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the health Professions.</p>
11	ZOO-202	Cell Biology & Immunology	2021	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the ultra-structural information of animal cell besides the detailed views of the cell interior revealing the various events and actions of cell at the molecular level.</p> <p>iii. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the principles of Graft rejection, Auto immunity and Antibody based therapy.</p>
12	ZOO-203A	Neurobiology & Animal Behavior	2021	<p>i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials</p>

				<p>ii. Students learnt and gain knowledge on structure and function of different types of Synapses</p> <p>iii. Gained information on different types of Neurotransmitters i.e. Amino acids and Peptides.</p> <p>iv. Understand the overview of Animal Behavior and prominence of social organization in insects and primates</p> <p>v. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p>
13	ZOO-203B	Bioinformatics & Biostatistics	2021	<p>i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology.</p> <p>ii. Describe different methods of data handling using computer.</p> <p>iii. Perform basic operations of gene sequence retrieval and compare them using different software.</p> <p>iv. Perform basic operations of protein structure retrieval and comparison using different software.</p> <p>v. The student will learn about the Computer basics like Operating systems, Programming, Data Access, Internet and Nucleic acid Sequence and Protein Data Banks.</p> <p>vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of dispersion like Mean deviation and Standard deviation and Co-efficient of Variation.</p> <p>v. The course will aid in learning Test of significance like Null hypothesis and Alternative hypothesis, t-test, F-test, Chi-square test, Correlation and Regression analysis.</p>
14	ZOO-204A	Enzymology	2021	<p>i. Students gain knowledge about regulation of enzyme activity with respective mechanisms</p> <p>ii. To understand about mechanism of enzymes in clinical diagnosis and their applications</p> <p>iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.</p>
15	ZOO-204B	Pathobiology	2021	<p>i. To understand the different pathogens causing disease in man.</p> <p>ii. Describe the different parasites causing disease and disability in</p>

				<p>man and animals.</p> <p>iii.Ability to elaborate about the life cycle and biology of disease carrying vectors; suggest preventive and control measures for the said diseases.</p> <p>iv. An understanding of the relationship between changes in physiology of host and</p> <p>v.The students after completion of the course based on the Expertise he/she may join as Parasitological Scientist.</p>
16	ZOO-205P	Practical-I Molecular Biology and Neurobiology & Animal Behavior / Bioinformatics & Biostatistics	2021	<p>i.Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they will also know the various tools and techniques related to bacterial microbiology.</p> <p>ii.Learnt about structure, function and organization of Neurons in the Central nervous system</p> <p>iii.Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials.</p> <p>iv.Understand the overview of Animal Behavior and prominence of social organization in insects and primates.</p> <p>v. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>vi.Students studying this course will be able to perform the data analysis using Statistical tools available on any computer such as Excel as well as the programmes for big and complex data.</p> <p>vii.Students learn and practice various statistical methods used in Zoological studies and research.</p>
17	ZOO-206P	Practical-II Cell Biology & Immunology and Enzymology/ Pathobiology	2021	<p>i.Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and</p>

				<p>cancers. They will know how to measure and stain different cell types.</p> <p>ii. Learn the fundamental principles of immune response including molecular, biochemical and cellular basis of immune homeostasis.</p> <p>iii. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.</p> <p>iv. Students learn about enzymes. Their classification and nomenclature</p> <p>v. Students learn about specificity of enzymes</p> <p>vi. Students learn about measurement of enzymatic activity</p> <p>vii. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.</p> <p>viii. Ability to elaborate about the life cycle and biology of disease carrying vectors; suggest preventive and control measures for the said diseases.</p> <p>ix. An understanding of the relationship between changes in physiology of host and Progress of pathogenesis in human beings and animals.</p>
18	ZOO-207	Audit Course-II Human Values and Professional Ethics-II	2021	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
19	ZOO-301	Developmental Biology	2021	<p>i. Students would gain expertise in explaining how a variety of interacting processes generate an organism's heterogenous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p> <p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity</p>

				complex and coordinated systems in organisms the students can apply this knowledge for research, and education, to solve the problems related to development in animals through research.
20	ZOO-302	Environmental Biology	2021	<p>i.Students will be able to apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.</p> <p>ii.Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.</p> <p>iii.Students will be able to be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p> <p>iv.Students will be able to use technology, such as geographical information systems and computer programming, to assist in problem solving.</p>
21	ZOO-303A	Animal Biotechnology	2021	<p>i.Understanding of in vitro culturing of organisms and production of transgenic animals.</p> <p>ii.Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors.</p> <p>iii.This insight allows students to take into consideration about ethical issues involved in production of transgenic animals and BT products.</p> <p>iv. Use in gene transfer technology, genetic manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p>
22	ZOO-303B	Microbiology	2021	<p>i.Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny</p> <p>ii.Classify the nutritional types of microorganisms and measure microbial growth</p> <p>iii.Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>iv.Assess impact of plant- microbe interaction on agriculture in both</p>

				beneficial and detrimental ways. Identify industrially important microbes.
23	ZOO-304P	Practical-I Developmental Biology & Environmental Biology and Animal Biotechnology/ Microbiology	2021	<p>i.Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to Education, Research and Extension programmes in his further career.</p> <p>iv.Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>v.Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors.</p> <p>vi.This insight allows students to take into consideration about ethical issues involved in production of transgenic animals and BT products.</p> <p>vii.Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny.</p> <p>viii.Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effective communicate with both specialist and non-specialist audiences/community.</p>
24	ZOO-305	Economic Zoology	2021	i. Creating the self-employment opportunities to rural students

				<p>through Animal husbandry, Aquaculture, Vermiculture and Sericulture.</p> <p>ii.To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices.</p> <p>iii.Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.</p>
25	ZOO-306A	Environmental Impact Assessment & Green Auditing	2021	<p>i.Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment</p> <p>ii.Explain the importance of environmental audits and other management tools in business for social benefit by improving environmental performance</p> <p>iii. Calculate the carbon footprint of any organization and identify suitable mitigation strategies for carbon reduction solutions.</p>
26	ZOO-306B	Human Health and Infectious diseases	2021	<p>i. To understand the basic concepts of Infectious diseases and the role of immunity to control infections</p> <p>ii.Provides knowledge on the physiological mechanisms leading to diseased conditions.</p> <p>iii.Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv.This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>
27	ZOO-401	Toxicology	2021	<p>i.The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research.</p> <p>ii.Understanding of the physiological and genotoxic effects of drugs and environmental toxins.</p> <p>iii. To understand various types of insecticides and understand their mode of action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible</p>

				<p>with other control strategies.</p> <p>iv.The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p>
28	ZOO-402	Comparative Animal Physiology	2021	<p>i.The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii.An appropriate understanding of functioning of each system of different groups of animals with their comparison will be acquainted.</p> <p>iii.Understanding of the basic concepts of Physiological regulation, from cellular to organ to organismal.</p> <p>iv.Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet.</p>
29	ZOO-403A	Biodiversity and Conservation	2021	<p>i.Student will gain knowledge about the diversity distribution pattern of the enormous number of species and different kind of ecosystems in the natural world.</p> <p>ii.The interaction between the various species and environment and the impact of social development on biodiversity</p> <p>iii.The importance of conservation of biodiversity which serving to the mankind and the ecosystem, and the major threats to biodiversity due to human developmental activities. The loss of biodiversity and the impact to the humankind.</p>
30	ZOO-403B	Animal husbandry and poultry farming	2021	<p>i. To understand Animal husbandry importance and applications to the farmers and industries .</p> <p>ii. To gain the knowledge, learn primary construction of dairy and poultry form establishment.</p> <p>iii. To gain knowledge in how to maintain the cattle and poultry forms.</p> <p>iv. To understand disease management strategies and control</p>

				measures of cattle and poultry forms.
31	ZOO-404P	Practical-Toxicology, Comparative Animal Physiology and Biodiversity and Conservation/ Animal husbandry and poultry farming	2021	<p>i.Skill development in environmental and occupational Toxicology.</p> <p>ii.It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain.</p> <p>iii.Identification of different routes of exposure of environmental toxins.</p> <p>iv.The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p> <p>v.The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>vi.Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fullest.</p> <p>vii.Student will gain knowledge about the diversity distribution pattern of the enormous number of species and different kind of ecosystems in the natural world.</p> <p>viii.The importance of conservation of biodiversity which serving to the mankind and the ecosystem, and the major threats to biodiversity due to human developmental activities. The loss of biodiversity and the impact to the humankind.</p> <p>ix.Will gain knowledge about legislations regarding the conservation of biodiversity.</p> <p>x. To understand the suitable breeds of livestock for rearing</p> <p>xi. To gain the knowledge how to apprise the various breeding techniques employed in live stock</p>
32	ZOO-405	Principles and Practices of Aquaculture	2021	<p>i. To understand significance, classification, history and cultivable species of aquaculture, and the inland water bodies suitable for culture in India</p> <p>ii.Through understanding criteria for the selection of species for culture</p>

				<p>iii. Various practices followed for the culture of fish and shrimp, and</p> <p>iv. Concepts of different types of culture.</p> <p>v. Feasibility of using sewage water for aquaculture</p>
33	ZOO-406A	Environmental Microbiology	2021	<p>i. Understand and describe the type of microorganisms in the environment and the role of microorganisms in the cycling of nutrients in an ecosystem.</p> <p>ii. Relate the role of microorganisms in spread of human diseases and select the type of physical and chemical agents for microbial control.</p> <p>iii. Understand the importance of plants and microbes in environmental remediation</p> <p>iv. Know the ethical guidelines in the use of GMOs, different biosafety levels and IPR</p>
34	ZOO-406B	Medical Biotechnology, IPR, Biostatistics and Bioethics	2021	<p>i. Students will gain awareness about Intellectual Property Rights (IPR) to take measures for protecting their ideas.</p> <p>ii. Gains knowledge on the Developmental stages of organism in Animal Biotechnology.</p> <p>iii. To understand and they will be able to devise business strategies by taking account of IPRs.</p> <p>iv. Students will develop awareness about bioethics and biosafety, Authorship and patenting / commercial rights and conflicts.</p>

Animal Biotechnology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ABT-101	Metabolic Regulation & Cell Function (MRCF)	2021	<ul style="list-style-type: none"> Knowledge on chemical bonds, thermodynamics principles and metabolisms of

				<p>Glycolysis, TCA Cycle and their biomedical importance will be gained.</p> <ul style="list-style-type: none"> • Metabolic discords of urea cycle and importance of proteins structure and functions can be understood. • Biosynthesis of purine and pyrimidine nucleotide and Clinical disorders of purine and pyrimidine metabolism can be learnt • To become proficient in Biomedical importance of lipids and over view metabolism of carbohydrate, protein and lipids
2	ABT-102	Tools & Techniques (TT)	2021	<ul style="list-style-type: none"> • Skills will be acquired on chromatography, centrifugation, electrophoresis and blotting techniques • To get knowledge on cell and tissue culture, cell types, culture media and overview of stem cell biology • To acquire skill on electrganetic spectrum, type of detectors, electrophysiological methods and brain activity recording techniques • Microscopic techniques, different fixation and staining techniques, tissue processing for microtomy, cryotechniques will be learnt
3	ABT-103A	Microbiology and Diseases	2021	<ul style="list-style-type: none"> • Microorganisms classification and structure of prokaryotic and eukaryotic microorganism can be understood • To get knowledge on Nutritional requirements to microorganisms, growth of microorganism, control of microorganism and microbes of biotechnological importance • To become proficient in chemical nature of gene, plasmids incompatibility, horizontal transfer of genome among the microbial community and Benzer's classical studied on II locus

				<ul style="list-style-type: none"> To learn diseases caused by microorganisms
4	ABT-103B	Environmental Biology	2021	<ul style="list-style-type: none"> Abilities will be developed to solve the problems related to the environment, to make them aware of various eco-friendly techniques and modern techniques to solve various environment-related problems. To make awareness among the young students about the surrounding environment, the impact of climate change and its mitigation and biodiversity. The aim of the contents of this course is to introduce and explain about various conservation issues of the ecosystem and animals. Man himself is a part of ecosystem. The ecosystems in the world are continuously under the pressure of anthropogenic activities and human mediated ecological changes. Several animal species are under the survival threats. To introduce the students about wildlife and wild habitats, about depleting wild life and human wildlife conflict.
5	ABT-104A	Environmental Biotechnology	2021	<ul style="list-style-type: none"> To gain knowledge on waste and pollutants, hazards from wastes and pollutants and hazards from chemicals in wastes Waste treatment, treatment of liquid wastes, treatment of solid waste and contributions of biotechnology to waste treatment will be understood To become proficient in aerobic waste water treatment and measurement of pollution levels To learn anaerobic treatment of waste water, biodegradation of xenobiotics compounds, hazards from xenobiotics and bioremediation
6	ABT-104B	Human Health and Infectious Diseases	2021	<ul style="list-style-type: none"> Introduction to the basic concepts of pathophysiology of infectious diseases

				<ul style="list-style-type: none"> • Major infectious diseases transmission to humans and response of immunity will be studied • To understand the Pathogenesis, mechanisms of pathogenesis; transmission and epidemiology of various bacterial, viral, fungal and protozoan diseases. • Sexually transmitted diseases will be studied
7	ABT-105P	Practical-1 Metabolic Regulation & Cell Function & Microbiology and Diseases/ Environmental Biology	2021	<ul style="list-style-type: none"> • Practical knowledge will be gained on biochemical assays like estimation of proteins, structural proteins, soluble proteins, free amino acids, total carbohydrates and total cholesterol. • To gain knowledge in handling equipments like cooling centrifuge, autoclave, laminar air flow etc., and, maintenance of animal cell culture laboratory. • To learn microbial media preparation for their culture and identification
8	ABT-106P	Practical-2 Tools & Techniques & Environmental Biotechnology/ Human Health and Infectious Diseases	2021	<ul style="list-style-type: none"> • Identification of proteins by using blotting technique • Practical knowledge will be gained on cell/tissue culture, culture media preparations • To learn tissue processing techniques for microscopic examination
9	ABT-107	Audit Course-I Human Values and Professional ethics-I	2021	<ul style="list-style-type: none"> • Knowledge will be gained on nature of ethics its relation to religion. Politics, Business • To understand nature of values Good and Bad, end and means, analysis of basic moral concepts, good behavior and respect for elders, character and conduct • Proficient on hagavad Githa • Crime and theories of punishment will be learnt
10	ABT-201	Molecular Biology (MB)	2021	<ul style="list-style-type: none"> • To gain knowledge on DNA structure, genome of Nuclear and mitochondrial and maternal Inheritance • To understand replication in prokaryotes,

				<p>Enzymology of DNA replication, Discontinuous replication and Bidirectional replication</p> <ul style="list-style-type: none"> • Synthesis of RNA, Types of RNA, Genetic code and Ribosome structure will be understood • Knowledge will be gained regulation I and II and Operon concepts
11	ABT-202	Animal Cell culture & Stem Cell Biology (ACC-SCB)	2021	<ul style="list-style-type: none"> • To understand animal cell culture, biology of stemcells and embryonic stem cell • To learn propagation of embryonic stem cells, nuclear transfer technology, animal cloning and stem cell differentiation • To gain knowledge on stem cell plasticity, stem cell assay and protocols, stem cell separations and stem cell therapies • To learn stem cells and tissue engineering, human embryonic stem cells and society, intellectual property results
12	ABT-203A	Cell Biology & Immunology (CB&IM)	2021	<ul style="list-style-type: none"> • Able to learn organization of prokaryotic and eukaryotic cell, Nucleus structure, Eukaryotic chromosome and polytene and lamp brush chromosomes • To learn mechanism of cell division, regulation of eukaryotic cellcycle, chromosomal abnormalities and tumor biology • To understand types of immunity, types of cell involved in immune response, structure and function of antibody and complimentarily cascade • To gain knowledge on Antigen presentation, hypersensitivity reactions, immune tolerance and immunopathology
13	ABT-203B	Animal Biotechnology	2021	<ul style="list-style-type: none"> • To introduce a detailed achievements of Biotechnology, Genetic Engineering and r-DNA

				<p>technology principles.</p> <ul style="list-style-type: none"> • To gain knowledge on cloning vectors and their uses in gene cloning technologies. • Principles of Cloning strategies and screening analysis of Re-combinations. • To apply principles of Biotechnology concepts in veterinary sciences i.e. production of Transgenic animals, Artificial insemination, Invitro fertilization, Embryo transfer technology. • Application of Biotechnological principles in Medicine and Gene transfer techniques. • To understand the uses of Fresh and marine pearl culture technology, IPR, Patents and Copyrights.
14	ABT- 204A	Toxicology	2021	<ul style="list-style-type: none"> • To understand the toxicodynamics, toxicokinetics of toxicants, xenobiotic metabolism, , chemical carcinogenesis, hepatotoxicology, genetic toxicology, developmental toxicology, renal toxicology, toxic effects of pesticides, toxic effects of metals, toxic effects of radiation, venoms and animal poisons, air pollution, ecotoxicology, food toxicology, forensic toxicology, occupational toxicology, regulatory toxicology, other. • To apprise the students about the toxicants along with their application and their effects on biosphere as well as human health
15	ABT-204B	Endocrinology	2021	<ul style="list-style-type: none"> • To study the concepts of Hormones, Structural features of Endocrine Glands • Identification of Endocrines glands of the body and their secretions • To study the evolution of Pancreatic and Adrenal gland hormones • To study the evolution of Thyroid and

				Parathyroid hormones and their role in the regulation of metabolism
16	ABT-205P	Practical -1 Molecular Biology & Cell Biology & Immunology / Animal Biotechnology	2021	<ul style="list-style-type: none"> To gain knowledge on DNA/RNA isolation from animal tissues To perform PCR based techniques like RAPD, Gene expression studies and disease diagnosis
17	ABT-206P	Practical-II Animal Cell culture & Stem Cell Biology & Toxicology/ Endocrinology	2021	<ul style="list-style-type: none"> To estimate the sperm motility, sperm count , sperm membrane integrity test and pH of semen. Determination sperm viability Preparation of primary and secondary cell culture
18	ABT-207	Audit Course-II Human Values and Professional Ethics-II	2021	<ul style="list-style-type: none"> To gain knowledge on value education To learn medical ethics To become proficient on business ethics To understand environmental ethics and social ethics
19	ABT-301	Enzymology (ENZ)	2021	<ul style="list-style-type: none"> To understand enzyme specificity, enzyme catalysis and isolation and purification of enzymes To gain knowledge on theories of enzymes kinetics, enzyme kinetics and its importance, effect of reactant concentrations and effect of temperature of pH and enzyme concentration reaction rate To become proficient on clinical aspects of enzymology, immobilized enzymes, isoenzymes and enzyme engineering
20	ABT-302	Animal Reproduction, Breeding & Transgenic Technology (ARBTT)	2021	<ul style="list-style-type: none"> To become proficient on structure and function of male and female reproductive system; reproductive cycles and contraception in male and females To gain skill on sex determination, selection for qualitative inherited characters, parental determination and verification and progeny testing

				<ul style="list-style-type: none"> • To understand artificial insemination techniques, in vitro fertilization, embryo transfer technology, microinjection and macroinjection • To learn transgenic technology development, generation of chimeric, transgenic and knockout mice
21	ABT-303A	Bioinformatics& Biostatistics	2021	<ul style="list-style-type: none"> • To understand prediction of protein structure and protein sequence database, prediction of gene structure, submission of sequence to database, phylogenetic analysis • To learn biostatistics, measures of location and dispersion, curve fitting and correlation and regression • To understand probability distribution, tests of significance, student t-test and F-test, chi square test and their application
22	ABT-303B	Genetic Engineering (GE)	2021	<ul style="list-style-type: none"> • Use of enzymes in DNA and RNA synthesis, restriction enzymes and ligation and modification o DNA • To learn vectors for constructions of genomic libraries, expression vectors, promoters and vectors used for cloning • To gain knowledge on DNA fragments, cDNA synthesis, PCR • To become proficient on ligation between cohesive and blunt end DNA fragments, introduction of cloned genes into host and expression of cloned genes
23	ABT- 304P	Enzymology / Animal Reproduction, Breeding & Transgenic Technology / Bioinformatics& Biostatistics/ Genetic Engineering	2021	<ul style="list-style-type: none"> • To determine the effect of substrate concentration, enzyme concentration and temperature on enzyme activity • Measurement of central tendency • Correlation and regression analysis

				<ul style="list-style-type: none"> • Retrieval of gene and protein sequence from gene and protein bank, redelivery
24	ABT-305	Bio resource Technology (Apiculture, Sericulture, Aquaculture, Vermiculture)	2021	<ul style="list-style-type: none"> • To understand Types of honey bees, life history of honey bees, management of apiculture and by products of honey bees and economic importance disease and their control • To become proficient on fresh water fin fish culture, shell fish (prawn and Pearls) culture • To understand historical background of vermicompost, methods of vermiculture and problems involved in vermicompost
25	ABT-306A	Animal Biotechnology & Industrial Applications	2021	<ul style="list-style-type: none"> • To gain knowledge on preservation animals engineered bacteria/yeast/ cell lines, metabolic engineering, fermentative production and glycolytic pathway • To understand monoclonal antibodies production and genetically engineered products • To know the DBT guidelines, Global scenario of transgenic micro organisms and ethical issues related to biotechnology products.
26	ABT-306B	Cancer Biology	2021	<ul style="list-style-type: none"> • To gain knowledge on cancer types and tumor development • To learn oncogenes, mechanisms of onogene activation and chromosomal translocation • To understand cell cycle regulation and cancer, DNA Damage and repair • To learn tumor immunology, Vaccine development, tumor cell evasion of immune defenses
27	ABT-401	MedicalBiotechnology	2021	<ul style="list-style-type: none"> • To understand disease diagnosis, use of

		(MBT)		<p>monoclonal antibodies in detection of genetic disease</p> <ul style="list-style-type: none"> • To learn Disease treatment, interferons, growth factor, and antisense nucleotide as therapeutic agent • To gain knowledge on gene therapy, types of gene therapy, augmentation therapy and targeted transfer • To become proficient on forensic medicine, preparation of DNA sample. Approaches for DNA analysis and applications of forensic medicine
28	ABT-402	Fermentation Technology and Downstreaming Process(FTDSP)	2021	<ul style="list-style-type: none"> • To understand cell distribution methods, separation techniques, purification by chromatographic techniques and isolation and screening and maintenance of industrially importance microbes • To learn bioreactor design, fermentation economics, upstream processing, membrane based separations • To gain knowledge on importance of downstream processing economics of downstream processing
29	ABT-403A	Drug design and Development	2021	<ul style="list-style-type: none"> • To learn drug design, analog approach of drug designing • To understand SAR Vs QSAR, Partition coefficient, Hammett's substituent constant and Taft's steric constant, Free Wilson mode, 3D-QSAR approach like COMFA and COMIA • To gain knowledge on pharmacological screening and assays, pharmacological screening models for therapeutic areas, cell based assay, biochemical assay, radiological binding assay, small molecule manufacturing • To learn Drug Laws, FDA, OECD, ICH,

				Schedule Y, drug registration, Regulations of human pharmaceuticals and biological products, and clinical trial design
30	ABT-403B	Biosafety, Bio Ethics & Intellectual Property rights	2021	<ul style="list-style-type: none"> • To understand socio-economic and legal impact of biotechnology, use of genetically modified organisms, moral and ethical issues in biotechnology and safety issues with GMO • To learn intellectual property right, evaluation of patenting, application of GATT and IPR and WTO Act and global and Indian biodiversity • To gain knowledge on Indian Patent Act 1970, role of country patent office, U.S. Patent trademark office and U.S. Paten system Vs Indian Patent system • To gain knowledge on Ethics and genetic engineering, patent of genes, human cloning, stem cel, regulatory requirements for drugs and biologics, GLP and GMP
31	ABT- 404	Project(Dissertation preparation & Submission)	2021	<ul style="list-style-type: none"> • Students must perform project work which includes experiments related to Toxicology, Animal Tissue culture, Fermentation technology or any work related to biology. • After completion of project work students have to prepare dissertation by their own and submit to the committee members.
32	ABT-405	Viva-Voce	2021	<ul style="list-style-type: none"> • Evaluation of dissertation will be conducted by committee members through Viva-Voce
33	ABT-406A	Advanced Genomics and Proteomics	2021	<ul style="list-style-type: none"> • To learn structure of Prokaryotic and Eukaryotic genomes, Isolation and purification of genomic DNA, Construction of Physical maps and Whole genome sequence alignment

				<ul style="list-style-type: none"> • To understand genome annotation, methods for gene identification, functional genomics, transcript profiling • To learn protein structure, sample preparation and separation 2D-analysis, Multidimensional liquid chromatography, protein-protein interactions analysis • To gain knowledge on DNA /protein sequence homologies, Gene duplication and divergence, and evolution of novel genes and proteins, DNA quantities and non-coding sequences (transposons) in genome evolution
34	ABT-406B	Animal Cell Culture Techniques	2021	<ul style="list-style-type: none"> • To understand Animal cell culture, culture medium, characteristics of cell in culture, measurement of viability and cytotoxicity , cell types and apoptosis • To gain knowledge in scaling up of animal cell culture, cell transformation, tissue engineering, transgenic animals, animal cloning • To become proficient in improvement of biomass, pharming products, plasminogen activator and ethical issues related to biotechnology products

45. Business Management

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	MBA 101	Management And Organisational Behaviour	2021	<p>Examine the Management concepts and functions.</p> <p>Apply the concepts of planning, decision making.</p> <p>Apply the concepts of delegation of authority,</p>

				<p>decentralisation and departmentation in real life situations.</p> <p>Analyse the controlling principles and practices, Ethics and corporate social responsibility.</p> <p>Evaluate the basic concepts of organizational conflicts and climate.</p>
2	MBA 102	Managerial Communications	2021	<p>Apply the basic concepts of communication for business correspondence.</p> <p>Distinguish different forms of communication.</p> <p>Evaluate different types of communication.</p> <p>Adapt report writing skills of different types on need basis.</p> <p>Acquire presentation skills along with the interview techniques.</p>
3	MBA 103	Managerial Economics	2021	<p>Describe the importance of managerial economics and its contribution to decision making in different types of business organizations by the managerial economist.</p> <p>Apply the basic principles of managerial economics.</p> <p>Apply demand analysis concept in the real life business situations.</p> <p>Discuss the meaning and usefulness of the production function and cost function in analysing the firm's production activity.</p>
4	MBA 104	Accounting For Managers	2021	<p>Outline the basic knowledge of accounting, bookkeeping, accounting Principles, accounting cycle.</p> <p>Apply the concepts of journal, ledger and Trail balance.</p> <p>Identify the nature of expenditure and revenue for preparation of financial statements of business.</p> <p>Examine the role of accounting policies like depreciation.</p>
5	MBA 105	Quantitative Analysis For Management Decisions	2021	<p>Recall the fundamentals in Mathematics and Statistics.</p>

				<p>Demonstrate the methods to solve derivatives, progressions and gaming.</p> <p>Choose decision making in a competitive situation.</p> <p>Solve transportation Problem with minimum cost of transport of commodities.</p>
7	MBA 106	Business Statistics	2021	<p>About the information needs, sources of data and measures of central tendency .</p> <p>The concept of Scientific Research and the methods of conducting Scientific Enquiry.</p> <p>The Statistical Tools of Data Analysis.</p>
8	MBA 108	Human Values And Professional Ethics	2021	<p>About ethics, values and morals.</p> <p>The concepts of value based education and its relevance.</p> <p>Learn about environmental and social ethics</p>
9	MBA 201	Marketing Management	2021	<p>Outline the concepts of marketing.</p> <p>Create the segmentation, targeting and positioning in marketing.</p> <p>Analyse various phases of product life cycle.</p> <p>Evaluate various methods of pricing and identify the best pricing strategy.</p> <p>Evaluate marketing communication strategies.</p>
10	MBA 202	Financial Management	2021	<p>Outline the basic concepts of Financial Management.</p> <p>Comprehend the various methods of Investment Analysis and apply various techniques of capital budgeting.</p> <p>Adapt the concepts of leverage, capital structure and its effect on the long term survival of the firm.</p> <p>Appraise various methods of computation of cost of capital.</p>
11	MBA 203	Human Resources Management	2021	<p>Outline the functions and challenges of HRM.</p> <p>Apply different concepts of HR Planning, Recruitment, Selection, Training, Interviewing Techniques and Executive Development Programs.</p> <p>:Apply the uses of job analysis, job description,</p>

				job specification, ergonomics in industry and the methods of job evaluation. Utilize the various methods of performance appraisal.
12	MBA 204	Production Management	2021	Apply the basic concepts of production and operations management and identify types of manufacturing processes. Define and explain concept of production planning and control. Identify effective plant location and plant layout. Design strategies to improve productivity.
13	MBA 205	Business Research Methods	2021	Adapt the fundamentals of Business research methodology. Identify research problem. Apply sample and census survey and measuring techniques. Design data collection techniques. Develop data processing procedures and apply tools. Draft thesis/report writing.
14	MBA 207	Management Information Systems	2021	Understand various types of information systems. Analyse the various functional information systems
15	MBA 206	Operation Research	2021	Understand various concepts and techniques of OR. Apply various OR techniques to improve the efficiency of the organisations.
16	MBA 208	Leadership Values and Styles	2021	Identify the leadership qualities to run an organization successfully. Appraise the various concepts of value based leadership.

Master of Computer Applications (MCA)

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MCA 101	Discrete Mathematical Structures	2021	<ol style="list-style-type: none"> 1. The students become familiar with the Sampling Distributions like with replacement and without replacement 2. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it. 3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution
2	MCA 102	Object Oriented Programming with Java	2021	<ol style="list-style-type: none"> 1. Solve and Implement solution for the problem using java basic elements like variables, control structures. 2. Handle Object Oriented Concepts effectively in the real time problems. 3. Understand the architecture and working procedure of platform independent language JAVA SDK.
3	MCA 103	Computer Organization	2021	<ol style="list-style-type: none"> 1. To gain knowledge about the Micro Processors. 2. To study the hierarchical memory system including cache memories and virtual memory.
4	MCA 104	Operating Systems	2021	<ol style="list-style-type: none"> 1. Learn evaluation of different types Operating System and their functionalities. 2. Learn Internal structure and the function procedure of Operating system in detail.
5	MCA 105	105A.Accounting and Financial management 105B.Accounting Essentials for Computer Applications	2021	<ol style="list-style-type: none"> 1. Use of Accounting information to managers with in the organization. 2. Informs the business decision & control the Management Functions.

6.	MCA 106 P	Software Lab I (based on 101 & 103)	2021	<ol style="list-style-type: none"> 1. The students become familiar with the Sampling Distributions like with replacement and without replacement 2. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it. 3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution. 4. To gain knowledge about the Micro Processors. 5. To study the hierarchical memory system including cache memories and virtual memory
7.	MCA 107 P	Object Oriented Programming Lab	2021	<ol style="list-style-type: none"> 1. Solve and Implement solution for the problem using java basic elements like variables, control structures. 2. Handle Object Oriented Concepts effectively in the real time problems. 3. Understand the architecture and working procedure of platform independent language JAVA SDK.
8.	MCA 108P	Operating Systems Lab	2021	<ol style="list-style-type: none"> 1. Learn evaluation of different types Operating System and their functionalities. 2. Learn Internal structure and the function procedure of Operating system in detail.
9.	MCA 201	Computer Oriented Operations Research	2021	<ol style="list-style-type: none"> 1. solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities. 2. formulate and solve problems as networks and graphs and set up decision models and use some solution methods for nonlinear optimization problems.

				<ol style="list-style-type: none"> 3. analyse the general nonlinear programming problems. 4. formulate the nonlinear programming models.
10.	MCA 202	Data Structures using Java	2021	<ol style="list-style-type: none"> 1. Develop a program a structured Programming Using JAVA. 2. Develop a Memory Handling work & Sequential Data file handling. 3. Maintain data using proper data organizing structures.
11	MCA 203	Data Communication and Computer Networks	2021	<ol style="list-style-type: none"> 1. Understand the Network Terminologies and the components used to build networks. 2. Understand Network Models (Topologies) to establish networked systems. 3. Understand the internal architecture, working procedure of OSI Layer and Protocols.
12	MCA 204	Advanced Database Management Systems	2021	<ol style="list-style-type: none"> 1. Students will get an attempt to provide with the advanced information about ADBMS and their development. 2. This Subject also provides the conceptual background necessary to design and develop distributed database System for real life applications and also helps to learn Query optimization, centralized query optimization, Distributed query optimization algorithms. 3. How SQL Programs are implemented as a series of primitive operations and how DDBs are implemented and how applications are design for those DDB
13	MCA 205	205A. E-Commerce	2021	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems.

				<ol style="list-style-type: none"> Understand the processes of developing and implementing information systems and be aware of the ethical, social, and security issues of information systems;
14		205B. Cyber Security	2021	<ol style="list-style-type: none"> Analyze and evaluate the cyber security needs of an organization and determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation. Measure the performance and troubleshoot cyber security systems and implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools. Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators, Design and develop a security architecture for an organization and design operational and strategic cyber security strategies and policies.
15		205C. Neural Networks	2021	<ol style="list-style-type: none"> Define what is Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network. Analyze ANN learning, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning and Boltzmann learning. Implement Simple perception, Perception learning algorithm, Modified Perception learning algorithm, and Adaptive linear combiner, Continuous perception, learning in continuous perception.
16	MCA 301	Software Engineering	2021	<ol style="list-style-type: none"> Develop a system in a systematic way by using various Prescriptive Process models like Waterfall and SDLC.

				<ol style="list-style-type: none"> 2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements. 3. Analyze and translate a specification into a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse
17	MCA 302	Computer Graphics	2021	<ol style="list-style-type: none"> 1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics. 2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis and Use of geometric transformations on graphics objects and their application in composite form. 3. Extract scene with different clipping methods and its transformation to graphics display device, Explore projections and visible surface detection techniques for display of 3D scene on 2D screen and Render projected objects to naturalize the scene in 2D view and use of illumination models for this.
18	MCA 303	Web Technologies	2021	<ol style="list-style-type: none"> 1. Explain the history of the internet and related internet concepts that are vital in understanding web development. 2. Discuss the insights of internet programming and implement complete application over the web and students can

				<p>Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.</p> <p>3. Utilize the concepts of JavaScript and Java, Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.</p>
19	MCA 304	304A.Data warehousing and Data mining	2021	<ol style="list-style-type: none"> 1. To identify the scope and essentiality of Data Warehousing and Mining and to analyze data, choose relevant models and algorithms for respective applications. 2. To study spatial and web data mining. 3. Students develop research interest towards advances in data mining.
20		304B.Big Data Analytics	2021	<ol style="list-style-type: none"> 1. Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. 2. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. 3. Students Interpret business models and scientific computing paradigms, and apply software tools for big data analytics and achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications
21		304C System Programming	2021	<ol style="list-style-type: none"> 1. Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems). 2. Ability to use theoretical and applied information in these areas to design

				<p>system software with realistic constraints.</p> <p>3. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language programming and Unix shell programming.</p>
22	MCA 305	305A. Cryptography and Network Security	2021	<p>1. Provide security of the data over the network and do research in the emerging areas of cryptography and network security.</p> <p>2. Implement various networking protocols.</p> <p>3. Protect any network from the threats in the world</p>
23		305B. Artificial Intelligence	2021	<p>1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations and Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.</p> <p>2. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.</p> <p>3. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool, Demonstrate proficiency in applying scientific method to models of machine learning and Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.</p>
24		305C. Mobile Application Development	2021	<p>1. Identify various concepts of mobile programming that make it unique from programming for other platforms, Critique mobile applications on their</p>

				<p>design pros and cons.</p> <ol style="list-style-type: none"> Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, Program mobile applications for the Android operating system that use basic and advanced phone features, and deploy applications to the Android marketplace for distribution.
25	MCA 401	401A.Cloud Computing	2021	<ol style="list-style-type: none"> Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient. Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model. Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS.
26		401B. Dot Net Technologies	2021	<ol style="list-style-type: none"> To explore .NET technologies for designing and developing dynamic, interactive and responsive web applications. Provide a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but

				<p>webdistributed, or executed remotely.</p> <ol style="list-style-type: none"> 3. Make the developer experience consistent across widely varying types of apps, such as Windowsbased apps and Web-based apps.
27		401C. Software Testing	2021	<ol style="list-style-type: none"> 1. List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects. 2. Distinguish characteristics of structural testing methods and demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible. 3. Discuss about the functional and system testing methods and demonstrate various issues for object oriented testing.
28	MCA 402	402A. Essentials of Data Science	2021	<ol style="list-style-type: none"> 1. Having a clear understanding of the subject related concepts and contemporary issues. 2. Having problem-solving ability- to assess social issues and engineering problems. 3. Having a clear understanding of professional and ethical responsibility. 4. Having cross-cultural competency exhibited by working as a member or in teams. And having a good working knowledge of communicating in English – communication with the engineering community and society
29		402B.Deep Learning	2021	<ol style="list-style-type: none"> 1. Understand the role of deep learning in machine learning applications and get familiar with the use of TensorFlow/Keras in deep learning applications. 2. Compare Various deep learning Algorithms used for Classification Segmentation and detection.

				3. Apply various concepts related with Deep Learning to solve Problems. Analyse different deep learning models in Image related projects.
30		402C.Internet of Things	2021	<ol style="list-style-type: none"> 1. Able to understand the application areas of IOT. 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. 3. Able to understand building blocks of Internet of Things and characteristics.
31	MCA 403	Major Project Work	2021	

M.Sc (CS) : Master of Computer Science

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MSCS -101C	Computer Organization	2021	<ol style="list-style-type: none"> 1. To gain knowledge about the Micro Processors. 2. To study the hierarchical memory system including cache memories and virtual memory.
2	MSCS -102C	Programming in Java & Data Structures	2021	<ol style="list-style-type: none"> 1. Develop a program a structured Programming Using JAVA. 2. Develop a Memory Handling work & Sequential Data file handling. 3. Maintain data using proper data organizing structures.
3	MSCS -103C	Operating Systems	2021	<ol style="list-style-type: none"> 1. Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,. 2. Analyze important algorithms eg. Process scheduling and memory management algorithms. 3. Categorize the operating system's

				<p>resource management techniques, dead lock management techniques, memory management techniques.</p> <p>4. Demonstrate the ability to perform OS tasks in Red Hat Linux Enterprise.</p>
4	MSCS –104 GE – A	Mathematical FoundationsFor ComputerScience	2021	<p>1. Ability to apply mathematical logic to solve problems.</p> <p>2. Understand sets, relations, functions, and discrete structures.</p> <p>3. Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.</p> <p>4. Able to formulate problems and solve recurrence relations.</p> <p>5. Able to model and solve real-world problems using graphs and trees.</p>
5	MSCS –104 GE - B	ComputerOrientedOperationalResearch	2021	<p>1. Solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities.</p> <p>2. Formulate and solve problems as networks and graphs and set up decision models and use some solution methods for nonlinear optimization problems.</p> <p>3. Analyse the general nonlinear programming problems.</p> <p>4. Formulate the nonlinear programming models.</p>
6	MSCS -05CF	Environmental Studies	2021	<p>1. Articulate the interconnected and interdisciplinary nature of environmental studies.</p> <p>2. Demonstrate an integrative approach to environmental issues with a focus on sustainability.</p> <p>3. Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences, and</p>

				<p>humanities in environmental problem solving.</p> <ol style="list-style-type: none"> 4. Communicate complex environmental information to both technical and non-technical audiences. 5. Understand and evaluate the global scale of environmental problems and reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.
7	MSCS -106EF	1. A. PC HardwareBasics	2021	<ol style="list-style-type: none"> 2. Identify the hardware components of a computer. Lists the hardware components such as processor, memory, disk, main board, etc. 3. Explains the features of the hardware components of a computer. Explains the relationships between the components of a computer and how data are transferred among the components. 4. identify the peripheral devices outside computer. Uses computer using input devices, such as keyboard and mouse. 5. Transfers data outside the computer using output devices, such as screen and printer. Saves files to removable devices and loads files from removable devices. 6. Connects to the Internet using network cards. identify the software's running on a computer. Identifies BIOS and changes settings in BIOS.
8	MSCS -106EF	B. Statistical Methods	2021	<ol style="list-style-type: none"> 1. Calculate and interpret the correlation between two variables. Calculate the simple linear regression equation for a set of data. 2. Employee the principles of linear regression and correlation, including least square method, predicting a particular

				<p>value of Y for a given value of X and significance of the correlation coefficient.</p> <ol style="list-style-type: none"> 3. Know the association between the attributes. Know the construction of point and interval estimators. 4. Evaluate the properties of estimators. Demonstrate understanding of the theory of maximum likelihood estimation.
9	MSCS -201C	AdvancedDataBase ManagementSystem	2021	<ol style="list-style-type: none"> 1. Explain and evaluate the fundamental theories for advanced database architectures and query operators. 2. Design and implement parallel database systems with evaluating different methods of storing, managing of parallel database. 3. Assess and apply database functions of distributed database. Evaluate different database designs and architecture. 4. Administer and analyze database with query optimization techniques and developWeb interface with database. 5. Understand advanced querying and decision support system.
10	MSCS -202C	ComputerNetworks	2021	<ol style="list-style-type: none"> 1. Describe the general principles of data communication. Describe how computer networks are organized with the concept of layered approach. 2. Describe how signals are used to transfer data between nodes. Implement a simple LAN with hubs, bridges and switches. 3. Describe how packets in the Internet are delivered. Analyze the contents in a given data link layer packet, based on the layer concept. 4. Design logical sub-address blocks with a given address block. Decide routing entries given a simple example of network topology.

				5. Describe what classless addressing scheme and how routing protocols work.
11	MSCS -203C	ComputerGraphics	2021	<ol style="list-style-type: none"> 1. The course introduces the basic concepts of computer graphics. It provides the necessary theoretical background and demonstrates the application of computer science to graphics. The course further allows students to develop programming skills in computer graphics through programming assignments. 2. Understands the core concepts and mathematical foundations of computer graphics knows fundamental computer graphics algorithms and data structures. 3. Has an overview of different modeling approaches and methods and has detailed knowledge about basic shading and texture mapping techniques. 4. Understands light interaction with 3D scenes.
12	MSCS-204 GE – A	E-Commerce	2021	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems. Understand the processes of developing and implementing information systems. 3. Be aware of the ethical, social, and security issues of information systems;
13	MSCS-204 GE B	AccountingAndFinancialManagement	2021	<ol style="list-style-type: none"> 1. Use of Accounting information to managers within the organization. 2. Informs the business decision & control the Management Functions.
14	MSCS-205CF	HumanRightsAnd ValueEducation	2021	<ol style="list-style-type: none"> 1. understand the historical growth of the idea of human rights. 2. demonstrate an awareness of the international context of human rights.

				<ol style="list-style-type: none"> 3. demonstrate an awareness of the position of human rights in the UK prior to 1998. 4. understand the importance of the Human Rights Act 1998, analyse and evaluate concepts and ideas.
15	MSCS-206 EF A	PrinciplesOf Management	2021	<ol style="list-style-type: none"> 1. Understand the concepts related to Business. 2. Demonstrate the roles, skills and functions of management. 3. Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions. 4. Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
16	MSCS-206 EF B	InternetOfThings	2021	<ol style="list-style-type: none"> 1. Able to understand the application areas of IOT. 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. 3. Able to understand building blocks of Internet of Things and characteristics.
17	MSCS-301C	DataWarehousing and Data Mining	2021	<ol style="list-style-type: none"> 1. Understand the functionality of the various data mining and data warehousing component. 2. Appreciate the strengths and limitations of various data mining and data warehousing models. 3. Explain the analyzing techniques of various data. 4. Describe different methodologies used in data mining and data ware housing. 5. Compare different approaches of data ware housing and data mining with various technologies.
18	MSCS-302C	WebTechnologies	2021	<ol style="list-style-type: none"> 1. Analyze a web page and identify its

				<p>elements and attributes.</p> <ol style="list-style-type: none"> 2. Create web pages using XHTML and Cascading Style Sheets. 3. Build dynamic web pages using JavaScript (Client side programming). Create XML documents and Schemas. 4. Build interactive web applications using AJAX.
19	MSCS-303C	Software Engineering	2021	<ol style="list-style-type: none"> 1. Develop a system in a systematic way by using various Prescriptive Process models like Waterfall and SDLC. 2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements. 3. Analyze and translate a specification into a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse
20	MSCS -304-GE-A	SystemsProgramming	2021	<ol style="list-style-type: none"> 1. Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems). 2. Ability to use theoretical and applied information in these areas to design system software with realistic constraints. 3. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language

				<p>programming and Unix shell programming.</p> <p>4. Ability to devise, select, and use modern techniques and tools needed for the design and implementation of system programs.</p>
21	MSCS -304-GE-B	ComputerAlgorithms	2021	<ol style="list-style-type: none"> 1. Apply design principles and concepts to algorithm design (c) 2. Have the mathematical foundation in analysis of algorithms (a, j) 3. Understand different algorithmic design strategies (j) 4. Analyze the efficiency of algorithms using time and space complexity theory (b)
22	MSCS -304-GE-C	UIDUsing.NetTechnologies	2021	<ol style="list-style-type: none"> 1. Provide a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but web distributed, or executed remotely. 2. Build all communication on industry standards to ensure that code based on .NET Framework integrates with any other code. 3. Building multi-tier enterprise applications. 4. Client-side programming: HTTP, CGI, Cookies, JavaScript, HTML, XML.
23	MSCS -304-GE-D	IT inForensicScience	2021	<ol style="list-style-type: none"> 1. Approach analysis of evidence without bias. 2. Develop a conceptual understanding of criminal justice system, rules of evidence, legal system. 3. develop professional, ethical graduates whose competence in problem-solving, legal analysis and application, quantitative reasoning, investigation and scientific laboratory procedures can be

				applied to immediate employment or advanced study.
24	MSCS -304-GE-E	SoftwareTesting	2021	<ol style="list-style-type: none"> 1. Various test processes and continuous quality improvement, Types of errors and fault models. 2. Methods of test generation from requirements. 3. Behavior modeling using UML: Finite state machines (FSM), Test generation from FSM models, Input space modeling using combinatorial designs. 4. Combinatorial test generation, Test adequacy assessment using: control flow, data flow, and program mutations, The use of various test tools. 5. Application of software testing techniques in commercial environments.
25	MSCS -305 GE-A	Cloud Computing	2021	<ol style="list-style-type: none"> 1. Understand the concepts, characteristics, delivery models and benefits of cloud computing 2. Understand the key security and compliance challenges of cloud computing 3. Understand the key technical and organisational challenges 4. Understand the different characteristics of public, private and hybrid cloud deployment models.
26	MSCS -305 GE-B	BigDataAnalytics	2021	<ol style="list-style-type: none"> 1. Understand Big Data and its analytics in the real world, Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics. 2. Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm, Design and Implementation of Big Data Analytics using pig and spark to solve data intensive problems and to

				<p>generate analytics.</p> <p>3. Implement Big Data Activities using Hive.</p>
27	MSCS -305 GE-C	ArtificialNeuralNetworks	2021	<ol style="list-style-type: none"> 1. Know the main provisions neuro mathematics, Know the main types of neural networks; 2. Know and apply the methods of training neural networks; 3. Know the application of artificial neural networks; 4. To be able to formalize the problem, to solve it by using a neural network.
28	MSCS -305 GE-D	Cyber Security	2021	<ol style="list-style-type: none"> 1. Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure. 2. Design, develop, test and evaluate secure software. 3. Develop policies and procedures to manage enterprise security risks. 4. Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training. 5. Interpret and forensically investigate security incidents.
29	MSCS -305 GE-E	Mobile AppDevelopment	2021	<ol style="list-style-type: none"> 1. Describe those aspects of mobile programming that make it unique from programming for other platforms, 2. Critique mobile applications on their design pros and cons, 3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, 4. Program mobile applications for the Android operating system that use basic and advanced phone features, and 5. Deploy applications to the Android marketplace for distribution.

47. Commerce

M.Com (R)

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Accounting Standards & Reporting	2021	<ul style="list-style-type: none"> i. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation ii. Impart the ability to find out the cash flows and provide the skills to value goodwill iii. Create awareness about IFRS and segment reporting
2	102.	Financial Management	2021	<ul style="list-style-type: none"> i. Describe meaning, functions and objectives; role of financial manager. ii. Examine investment decision, capital budgeting, techniques of CB and methods of CB. iii. Investigate management of working capital, needs and concepts. iv. Asses financing decision, capital structure and capital theories. v. Design dividend decision and theories of dividend.
3	103.	Business Environment and Policy	2021	<ul style="list-style-type: none"> i. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment. ii. Illustrates economic environment nature and scope and new economic policy. iii. Develop political, legal environment; reasons for state intervention and government business interface. iv. Study the socio cultural environment nature, impact of social responsibility and business ethics. v. Interpret global environment; benefits and problems of MNCs and WTO.

4	104.	Organisational Behaviour	2021	<ul style="list-style-type: none"> i. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation ii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts. iii. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.
5	105a	Quantitative Techniques for Business Decisions	2021	<ul style="list-style-type: none"> i. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions. ii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions. iii. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.
6	106a	Business Communication Skills	2021	<ul style="list-style-type: none"> i. To understand the basics of process, models and methods of communication. ii. To analyse various types of non-verbal communication skills and to analyse various types of verbal communication skills. iii. To discuss the contents of various written communication tools and to evaluate the protocols for cross-cultural communication across the globe.
7	201	Advanced cost Accounting	2021	<ul style="list-style-type: none"> i. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting; ii. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits. iii. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets. iv. Perceive the significance of ABC in cost ascertainment and control.

8	202.	Financial Markets and Services	2021	<ul style="list-style-type: none"> i. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market. ii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market. iii. Create plans and understand the metrics for getting finance from venture capital firms.
9	203.	Strategic Financial Management	2021	<ul style="list-style-type: none"> i. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics, ii. Explain Strategic financial management success factors and constraints. iii. Illustrate corporate valuation approaches and guidelines; value based management. iv. Identify financial distress and restructuring; countering financial distress. v. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.
10	204.	Corporate Governance	2021	<ul style="list-style-type: none"> i. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices. ii. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India. iii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India. iv. Understand the CG standards and practices in India with focus on IT and futures of CG in India.
11	205a	Working Capital Management	2021	<ul style="list-style-type: none"> i. To impart basic knowledge on working capital concepts and source of WCand to provide the skills to estimate working capital ii. To enables the students familiarise with the cash management techniques and comprehend the concept of receivables and its management. iii. To provide the skills of inventory management with different techniques.

12	206a	e-Banking Operations	2021	<ul style="list-style-type: none"> i. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India. ii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications. iii. Categorize the financial frauds in e-banking sector.
13	301	Security Analysis and Portfolio Management	2021	<ul style="list-style-type: none"> i. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models. ii. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index. iii. Synthesize portfolio revision, need and strategies.
14	302.	Accounting for Managerial Decisions	2021	<ul style="list-style-type: none"> i. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing. ii. Study the concept of Responsibility Accounting and its uses and trends. iii. Know the essential parameters for evaluation of divisional performance and the emerging issues today iv. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.
15	303a	Tally with GST Application	2021	<ul style="list-style-type: none"> i. To acquaint oneself with skills to prepare financial statements through Tally ERP. ii. To understand basics of GST system and to know steps involved in generating GSTR reports. iii. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.
16	303c	Tax planning &	2021	<ul style="list-style-type: none"> i. To comprehend the basic knowledge about tax concepts and planning and To

	.	Management		<p>provide knowledge on sources of income under different heads</p> <p>ii. Acquire the knowledge on tax planning with regard to location</p> <p>iii. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.</p>
17	304	Internal Audit and Standard Audit Practices	2021	<p>i. Conceptualise the knowledge in internal control including evaluation techniques.</p> <p>ii. Learn the meaning, features, objectives and advantages of internal audit and ascertain the basis of auditing with information systems by skill enhancement.</p> <p>iii. Illustrate the audit under computerised information system environment along with its internal control.</p> <p>iv. Outline and synthesize the reporting and its presentation techniques.</p>
18	305a	Fundamentals of Accounting	2021	<p>i. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts</p> <p>ii. To help the students to acquire the skills of financial statement analysis</p> <p>iii. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.</p>
19	401	Financial Derivatives	2021	<p>i. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions.</p> <p>ii. Prioritise options in financial derivatives and option pricing models.</p> <p>iii. Compose swap market futures, types and interest rate; pricing swaps.</p> <p>iv. Synthesize stock index futures, options and trading of stock futures and options.</p>
20	402.	Project Planning & Control	2021	<p>i. Define a project and operations of corporate long range planning and phases of capital budgeting.</p> <p>ii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>iii. Illustrates financial analysis project planning, forms of project organization</p>

				<p>and performance evaluation of project.</p> <p>iv. Understand Social cost benefit analysis and methods of SCBA</p> <p>v. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403a	Insurance Management	2021	<p>i. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>ii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>iii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon.</p> <p>iv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>v. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
22	403d	GST and Customs Duty	2021	<p>i. Outline the concepts of GST, its applicability, features and objectives and look into the registration procedures and return types under GST.</p> <p>ii. Exemplify about the supply of goods and services along with valuation.</p> <p>iii. Draft the eligibility for ITC by learning the concepts of ITC.</p> <p>iv. Ascertain customs duty and find out its assessable value.</p>
23	405a	Security Market Operations	2021	<p>i. Learn the basic concepts of Indian securities market.</p> <p>ii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>iii. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>

M.Com (A&F)

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Accounting Standards & Reporting	2021	<p>iv. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation</p> <p>v. Impart the ability to find out the cash flows and provide the skills to value goodwill</p> <p>vi. Create awareness about IFRS and segment reporting</p>
2	102.	Financial Management	2021	<p>vi. Describe meaning, functions and objectives; role of financial manager.</p> <p>vii. Examine investment decision, capital budgeting, techniques of CB and methods of CB.</p> <p>viii. Investigate management of working capital, needs and concepts.</p> <p>ix. Asses financing decision, capital structure and capital theories.</p> <p>x. Design dividend decision and theories of dividend.</p>
3	103.	Business Environment and Policy	2021	<p>vi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment.</p> <p>vii. Illustrates economic environment nature and scope and new economic policy.</p> <p>viii. Develop political, legal environment; reasons for state intervention and government business interface.</p> <p>ix. Study the socio cultural environment nature, impact of social responsibility and business ethics.</p> <p>x. Interpret global environment; benefits and problems of MNCs and WTO.</p>
4	104.	Organisational Behaviour	2021	<p>iv. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation</p> <p>v. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts.</p> <p>vi. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.</p>

5	105a	Quantitative Techniques for Business Decisions	2021	<ul style="list-style-type: none"> iv. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions. v. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions. vi. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.
6	106a	Business Communication Skills	2021	<ul style="list-style-type: none"> iv. To understand the basics of process, models and methods of communication. v. To analyse various types of non-verbal communication skills and to analyse various types of verbal communication skills. vi. To discuss the contents of various written communication tools and to evaluate the protocols for cross-cultural communication across the globe.
7	201	Advanced cost Accounting	2021	<ul style="list-style-type: none"> v. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting; vi. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits. vii. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets. viii. Perceive the significance of ABC in cost ascertainment and control.
8	202.	Financial Markets and Services	2021	<ul style="list-style-type: none"> iv. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market. v. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market. vi. Create plans and understand the metrics for getting finance from venture capital firms.

9	203.	Strategic Financial Management	2021	<p>vi. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>vii. Explain Strategic financial management success factors and constraints.</p> <p>viii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>ix. Identify financial distress and restructuring; countering financial distress.</p> <p>x. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2021	<p>v. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>vi. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>vii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>viii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205a	Working Capital Management	2021	<p>iv. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>v. To enables the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>vi. To provide the skills of inventory management with different techniques.</p>
12	206a	e-Banking Operations	2021	<p>iv. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>v. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>vi. Categorize the financial frauds in e-banking sector.</p>
13	301	Security Analysis and Portfolio	2021	<p>iv. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models.</p>

		Management		<ul style="list-style-type: none"> v. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index. vi. Synthesize portfolio revision, need and strategies.
14	302.	Accounting for Managerial Decisions	2021	<ul style="list-style-type: none"> v. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing. vi. Study the concept of Responsibility Accounting and its uses and trends. vii. Know the essential parameters for evaluation of divisional performance and the emerging issues today viii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.
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16	303c .	Tax planning & Management	2021	<ul style="list-style-type: none"> iv. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads v. Acquire the knowledge on tax planning with regard to location vi. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.
17	304	Internal Audit and Standard Audit Practices	2021	<ul style="list-style-type: none"> v. Conceptualise the knowledge in internal control including evaluation techniques. vi. Learn the meaning, features, objectives and advantages of internal audit and ascertain the basis of auditing with information systems by skill enhancement.

				<p>vii. Illustrate the audit under computerised information system environment along with its internal control.</p> <p>viii. Outline and synthesize the reporting and its presentation techniques.</p>
18	305a	Fundamentals of Accounting	2021	<p>iv. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts</p> <p>v. To help the students to acquire the skills of financial statement analysis</p> <p>vi. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.</p>
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20	402.	Project Planning & Control	2021	<p>vi. Define a project and operations of corporate long range planning and phases of capital budgeting.</p> <p>vii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>viii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>ix. Understand Social cost benefit analysis and methods of SCBA</p> <p>x. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403a	Insurance Management	2021	<p>vi. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>vii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>viii. Understand different types of non-life insurance with reference to marine</p>

				<p>and fire insurance and their progress and claim settlement thereon.</p> <p>ix. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>x. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
22	403d	GST and Customs Duty	2021	<p>v. Outline the concepts of GST, its applicability, features and objectives and look into the registration procedures and return types under GST.</p> <p>vi. Exemplify about the supply of goods and services along with valuation.</p> <p>vii. Draft the eligibility for ITC by learning the concepts of ITC.</p> <p>viii. Ascertain customs duty and find out its assessable value.</p>
23	405a	Security Market Operations	2021	<p>iv. Learn the basic concepts of Indian securities market.</p> <p>v. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>vi. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>

M.Com (FM)

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1	101	Accounting Standards & Reporting	2021	<p>vii. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation</p> <p>viii. Impart the ability to find out the cash flows and provide the skills to value goodwill</p> <p>ix. Create awareness about IFRS and segment reporting</p>
2	102.	Financial Management	2021	<p>xi. Describe meaning, functions and objectives; role of financial manager.</p> <p>xii. Examine investment decision, capital budgeting, techniques of CB and methods of CB.</p> <p>xiii. Investigate management of working capital, needs and concepts.</p> <p>xiv. Asses financing decision, capital structure and capital theories.</p> <p>xv. Design dividend decision and theories of dividend.</p>

3	103.	Business Environment and Policy	2021	<p>xi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment.</p> <p>xii. Illustrates economic environment nature and scope and new economic policy.</p> <p>xiii. Develop political, legal environment; reasons for state intervention and government business interface.</p> <p>xiv. Study the socio-cultural environment nature, impact of social responsibility and business ethics.</p> <p>xv. Interpret global environment; benefits and problems of MNCs and WTO.</p>
4	104.	Organisational Behaviour	2021	<p>vii. Acquire knowledge on the conceptual framework and emerging issues of OB and Study different theories of personality and motivation</p> <p>viii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts.</p> <p>ix. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.</p>
5	105a	Quantitative Techniques for Business Decisions	2021	<p>vii. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions.</p> <p>viii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions.</p> <p>ix. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.</p>
6	106a	Business Communication Skills	2021	<p>vii. To understand the basics of process, models and methods of communication.</p> <p>viii. To analyse various types of non-verbal communication skills and to analyse various types of verbal communication skills.</p> <p>ix. To discuss the contents of various written communication tools and to evaluate the protocols for cross-cultural communication across the globe.</p>
7	201	Advanced cost	2021	<p>ix. Obtain knowledge on the concept of cost accounting and know how it is</p>

		Accounting		<p>different from financial and management accounting;</p> <p>x. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits.</p> <p>xi. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets.</p> <p>xii. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial Markets and Services	2021	<p>vii. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market.</p> <p>viii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>ix. Create plans and understand the metrics for getting finance from venture capital firms.</p>
9	203.	Strategic Financial Management	2021	<p>xi. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>xii. Explain Strategic financial management success factors and constraints.</p> <p>xiii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>xiv. Identify financial distress and restructuring; countering financial distress.</p> <p>xv. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2021	<p>ix. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>x. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>xi. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>xii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>

11	205a	Working Capital Management	2021	<p>vii. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>viii. To enable the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>ix. To provide the skills of inventory management with different techniques.</p>
12	206a	e-Banking Operations	2021	<p>vii. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>viii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>ix. Categorize the financial frauds in e-banking sector.</p>
13	301	Security Analysis and Portfolio Management	2021	<p>vii. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models.</p> <p>viii. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index.</p> <p>ix. Synthesize portfolio revision, need and strategies.</p>
14	302.	Accounting for Managerial Decisions	2021	<p>ix. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing.</p> <p>x. Study the concept of Responsibility Accounting and its uses and trends.</p> <p>xi. Know the essential parameters for evaluation of divisional performance and the emerging issues today</p> <p>xii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.</p>
15	303a	Tally with GST Application	2021	<p>vii. To acquaint oneself with skills to prepare financial statements through Tally ERP.</p>

				<p>viii. To understand basics of GST system and to know steps involved in generating GSTR reports.</p> <p>ix. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.</p>
16	303c	Tax planning & Management	2021	<p>vii. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads</p> <p>viii. Acquire the knowledge on tax planning with regard to location</p> <p>ix. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.</p>
17	304	Internal Audit and Standard Audit Practices	2021	<p>ix. Conceptualise the knowledge in internal control including evaluation techniques.</p> <p>x. Learn the meaning, features, objectives and advantages of internal audit and ascertain the basis of auditing with information systems by skill enhancement.</p> <p>xi. Illustrate the audit under computerised information system environment along with its internal control.</p> <p>xii. Outline and synthesize the reporting and its presentation techniques.</p>
18	305a	Fundamentals of Accounting	2021	<p>vii. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts</p> <p>viii. To help the students to acquire the skills of financial statement analysis</p> <p>ix. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.</p>
19	401	Financial Derivatives	2021	<p>ix. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions.</p> <p>x. Prioritise options in financial derivatives and option pricing models.</p> <p>xi. Compose swap market futures, types and interest rate; pricing swaps.</p> <p>xii. Synthesize stock index futures, options and trading of stock futures and options.</p>
20	402.	Project Planning & Control	2021	<p>xi. Define a project and operations of corporate long range planning and phases of capital budgeting.</p>

				<p>xii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>xiii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>xiv. Understand Social cost benefit analysis and methods of SCBA</p> <p>xv. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403a	Insurance Management	2021	<p>xi. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>xii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>xiii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon.</p> <p>xiv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>xv. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
22	403d	GST and Customs Duty	2021	<p>ix. Outline the concepts of GST, its applicability, features and objectives and look into the registration procedures and return types under GST.</p> <p>x. Exemplify about the supply of goods and services along with valuation.</p> <p>xi. Draft the eligibility for ITC by learning the concepts of ITC.</p> <p>xii. Ascertain customs duty and find out its assessable value.</p>
23	405a	Security Market Operations	2021	<p>vii. Learn the basic concepts of Indian securities market.</p> <p>viii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>ix. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	BP101T	Human Anatomy and Physiology I–Theory	2021	<ol style="list-style-type: none"> 1. Know the fundamental knowledge on the structure and functions of the various systems of the human body. 2. understanding all the homeostatic mechanisms of the body 3. Understand the relationship of anatomy with various disciplines of pharmacy. 4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition
2	BP102T	Pharmaceutical Analysis I–Theory	2021	<ol style="list-style-type: none"> 1. It gives knowledge about the fundamental methodology to prepare different strength of solutions. 2. It facilitate the students to predict the sources of mistakes and errors. 3. It also helps to develop the fundamentals of volumetric analytical skills. 4. It provides the basic knowledge in the principles of electrochemical analytical techniques The student will be provided with the skills to improve by the course content in terms of analytical techniques to perform the estimation of different category drugs.
3	BP104T	Pharmaceutical Inorganic Chemistry–Theory	2021	1.To understand the history and concept of pharmacopoeia and its editions.

				<p>2. Knowledge about the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals.</p> <p>3. Identification of limit tests of different pharmaceutical inorganic compounds.</p> <p>4. To understand the method to prepare inorganic pharmaceuticals.</p> <p>5. To justify the medicinal importance of acidifiers, antacids, cathartics and antimicrobial agents as gastrointestinal agents.</p> <p>6. To discuss the handling and applications of radiopharmaceuticals</p>
4	BP105T	Communication skills– Theory	2021	<p>1. To equip students with Pre-presentations and to understand the structure of a good presentation and devise various techniques for delivering a successful presentation.</p> <p>2. To help students overcome stage fear and take questions.</p> <p>3. To enable the students to become global citizens.</p> <p>4. This course will prepare the young pharmacy student to interact effectively with doctors, nurses and other health workers.</p>

				<p>5. At the end of the course the students will get the soft skills set to work cohesively with the team as a team player and addvalue to the pharmaceutical business.</p>
5	BP106RBT	REMEDIAL BIOLOGY–Theory	2021	<p>1.know the kingdoms of life. 2.know the body fluids, absorption, digestion, respiration. 3.know the excretory products, neural control, chemical coordination, and human reproduction. 4.know the Nutrition in plants and photosynthesis. 5.know the respiration in plants, cell, and tissues.</p>
6.	BP106RMT	Remedial Mathematics– Theory	2021	<p>1. This program shall create an awareness about the mathematical problems, to develop an statistical evaluation. 2. To adopt skills in identifying and solving problems. 3. Know the theory and their application in Pharmacy research 4. Solve the different types of problems by applying theory in drug discovery</p>
7.	BP107P	Human Anatomy and Physiology – Practical	2021	<p>1. Differentiate the structures of the various systems of the human body. 2. Perform the experiments like blood cell count, hemoglobin content, bleeding and clotting time and various physiological Parameters theoretically and practically. 3. Identify the structural (microscopically and</p>

				macroscopically) and functional details about different organ systems such as cardiovascular, lymphatic, digestive, muscular system
8.	BP108P	Pharmaceutical Analysis I – Practical	2021	<ol style="list-style-type: none"> 1. This course is designed to perform and get trained to the electro chemical tests like potentiometry, complexometry, polarimetry. 2. Hands on training on different titrations like complexometric titrations, precipitation titrations, redox titrations. 3. Under stand the process of limit test and procedures. 4. Gain knowledge on the determination of Normality, Molarity, Molality. 5. Under stand the process how to Prepare the solution and its standardization
9.	BP109P	Pharmaceutics I – Practical	2021	<ol style="list-style-type: none"> 1. This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts of preparing the different conventional dosage forms. 2. To understand the different pharmaceutical calculation involved in formulation; 3. Practical knowledge on formulation procedure of different dosage forms; 4. Highlights the Practical allowance to formulate different types of dosage forms;and <p>Gain Knowledge on criteria to appreciate the good formulation for effectiveness</p>
10.	BP110P	Pharmaceutical Inorganic Chemistry– Practical	2021	<ol style="list-style-type: none"> 1. To recall the sources of limit tests, preparation and identification of compounds. 2. To demonstrate the preparation of inorganic pharmaceuticals 3. To apply knowledge to perform modified limit

				<p>tests.</p> <p>4. To analyze various inorganic pharmaceutical compounds.</p> <p>5. To select suitable method for the preparation of inorganic pharmaceuticals.</p> <p>6.To assess quality of inorganic pharmaceuticals.</p>
11	BP111P	Communication skills– Practical	2021	<p>1.To equip students with Pre-presentations and to understand the structure of a good presentation and devise various techniques for delivering a successful presentation.</p> <p>2.To help students overcome stage fear and take questions.</p> <p>3.To enable the students to become global citizens.</p> <p>4.This course will prepare the young pharmacy student to interact effectively with doctors, nurses and other health workers.</p> <p>5.At the end of the course the students will get the soft skills set to work cohesively with the team as a team player and add value to the pharmaceutical business.</p>
12	BP112RBP	Remedial biology – Practical	2021	<p>1. How to use microscope, section cutting, mounting, staining, and permanent slide preparation.</p> <p>2. About the cell and its functions.</p> <p>3. About the frog with respect to human.</p> <p>4. About the bone and tissues in humans and</p>

				plants. 5. About the blood groups, blood pressure and tidal volume
13	BP 201T	Human Anatomy and Physiology-II – Theory	2021	<ol style="list-style-type: none"> 1. Know the gross morphology, structure and functions of various organs of the human body. 2. Perform all the hematological tests with the help of specimens 3. Note all the points regarding the tissues various organs of human body 4. Brief knowledge on clinical significance of various systems in our body. 5. Application of the role of genetics in day to day life.
14	BP202T	Pharmaceutical Organic Chemistry I – Theory	2021	<ol style="list-style-type: none"> 1. Guess and write the structure, systematic/trivial name, and pharmaceutical uses (if any) associated with the specified organic compounds. 2. Understand the general concept of isomerism and distinguish structural isomers. 3. Infer the chemical nature of the compounds on the basis of qualitative chemical tests. 4. Understand the significance of certain electronic effects with respect to the reactivity/ stability of organic compounds specified. 5. Understand and gain insight into the organic reactions by analyzing their fair reaction mechanisms.
15	BP203T	Biochemistry – Theory	2021	<ol style="list-style-type: none"> 1. Know the fundamental knowledge on the biochemical Pathways of the body 2. understanding the catalytic role of enzymes,

				<p>importance of enzyme inhibitors</p> <ol style="list-style-type: none"> 3. Understand the genetic organization of mammalian genome 4. Understand the DNA in the synthesis of RNAs and proteins
16	BP 204T	PATHOPHYSIOLOGYI–Theory	2021	<ol style="list-style-type: none"> 1. Identifies Name the signs, symptoms and complications of the diseases. 2. Students Get thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. 3. To Study the aetiology and pathogenesis of the selected disease states 4. The baseline knowledge required to practice medicine safely, confidently, rationally and effectively.
17	BP205T	Computer Applications in Pharmacy – Theory	2021	<ol style="list-style-type: none"> 1 know the various types of application of computers in pharmacy profession 2. know the various types of databases used in profession 3. know the usage of softwares in pharmacy
18	BP206T	Environmental Science– Theory	2021	<ol style="list-style-type: none"> 1. This program shall create an awareness about environmental problems, develop an attitude

				<p>towards of concern for the environment.</p> <p>2 To compare the natural, renewable and non-renewable resources and the problems associated with them.</p> <p>3 To motivate the learners to participate in environment protection and improvement.</p> <p>4 To analyze the concepts of eco system including structure and functions.</p> <p>5 To adopt skills in identifying and solving environmental problems.</p> <p>6 To develop an attitude of concern for the environment.</p>
19	BP207P	Human Anatomy And Physiology II – (Practical)	2021	<p>This subject is to inculcate the students about the structure and functioning of various systems and to perform hematological tests, body temperature and BMI.</p> <p>1. Prepare the charts and tables for easy understanding of various systems and positive & negative feed back mechanism.</p> <p>2. Awareness on family planning devices and pregnancy diagnosis test.</p> <p>3. Identify the structural (microscopically and macroscopically) and functional details about different organ systems such as cardiovascular, lymphatic, digestive, muscular system</p>

20	BP208P	Pharmaceutical Organic Chemistry I - Practical	2021	<ol style="list-style-type: none"> 1. Assess the identity in terms of the physico-chemical properties of the compounds of specified chemical classes. 2. Get hands- on- experience in basic techniques of organic synthesis.
21	BP209P	Biochemistry – Practical	2021	<ol style="list-style-type: none"> 1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch), Proteins (albumin and Casein) 2. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method) 3. Qualitative analysis of urine for abnormal constituents 4. Determination of blood creatinine, blood sugar, serum total cholesterol
22	BP210P	Computer Applications in Pharmacy – Practical	2021	<ol style="list-style-type: none"> 1 know the various types of application of computers in pharmacy profession 2. know the various types of databases used in profession 3. know the usage of softwares in pharmacy
23	BP 301 T	Pharmaceutical organic chemistry II (Theory)	2021	<ol style="list-style-type: none"> 1. Guess and writethestructure according to the stereochemical specifications. 2. Fairly understand the aspects of heterocyclic chemistry in terms of naming and reactivity. 3. Assess and understand the pharmaceutical applications and importance of the specified named reactions
24	BP 302 T	Physical Pharmaceutics I (Theory)	2021	The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms

25	BP 303 T	Pharmaceutical Microbiology (Theory)	2021	<ol style="list-style-type: none"> 1. To acquire knowledge on HVAC systems, layout designs, GMP standards sanitation personal hygiene in sterile product manufacturing facilities. 2. To know the various types of sterile products with their formulation in large scale industries. 3. To develop skill for lab scale manufacture of few SVPs, LVPs, ophthalmic products with labelling and quality control.
26	BP 304 T	Pharmaceutical Engineering (Theory)	2021	<ol style="list-style-type: none"> 1. To know various unit operations involved in manufacturing of pharmaceuticals. 2. To understand the concepts of flow of fluids, size reduction and size separation. 3 To perform different mechanisms of heat transfer. 4 To compare and contrast different types of evaporation and distillation process. 5 To determine the factors influencing mixing, filtration and centrifugation. 6 To elaborate various preventive methods used for corrosion control in pharmaceutical industries
27	BP 305 P	Pharmaceutical organic chemistry II (Practical)	2021	<ol style="list-style-type: none"> 1. Assess the identity in terms of the physico-chemical properties of the compounds of

				<p>specified chemical classes.</p> <p>2. Get hands-on experience in basic techniques of organic synthesis</p>
28	BP 306 P	Physical Pharmaceutics I (Practical)	2021	This course helps to compare and evaluate the solubility of various combination compounds and modify for better solubility approaches by using different levels of methods
29	BP 307 P	Pharmaceutical Microbiology (Practical)	2021	<ol style="list-style-type: none"> 1. Learners gain knowledge on some sterile marketed products along with blood products which are not possible in laboratory and large scale manufacture. 2. To know the skills of aseptic techniques principles of sterilization and validation of aseptic areas. 3. Knowledge on blood products and surgical dressing with their formulation details, production and quality control.
30	BP 308 P	Pharmaceutical Engineering (Practical)	2021	<ol style="list-style-type: none"> 1. To understand the basic principles involved in unit operations such as size reduction, size separation, distillation and drying. 2. To demonstrate and explain about the construction, working and applications of pharmaceutical equipment's such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer. 3. To experiment with the process variables of filtration, evaporation and infer the same. 4. To determine radiation constant of brass, iron,

				<p>unpainted and painted glass.</p> <p>5. To determine overall heat transfer coefficient by heat exchanger and calculate the efficiency of steam distillation.</p> <p>6. To estimate moisture content, loss on drying and construct drying curves for calcium carbonate and starch</p>
31	BP 401 T	Pharmaceutical organic chemistry III (Theory)	2021	<ol style="list-style-type: none"> 1. Guess and write the structure according to the stereochemical specifications. 2. Fairly understand the aspects of heterocyclic chemistry in terms of naming and reactivity. 3. Assess and understand the pharmaceutical applications and importance of the specified named reactions.
32	BP 402 T	Medicinal chemistry I (Theory)	2021	<ol style="list-style-type: none"> 1. Fundamental knowledge on the structure, chemistry and therapeutic value of drugs. 2. Understand the Structural Activity Relationship (SAR) of drugs. 3. Importance of physicochemical properties and metabolism of drugs. 4. Chemical synthesis of important drugs under each class.

33	BP 403 T	Physical Pharmaceutics II (Theory)	2021	<ol style="list-style-type: none"> 1. The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. 2. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms
34	BP 404 T	Pharmacology I (Theory)	2021	<ol style="list-style-type: none"> 1. The subject is to impart knowledge about the action of the drug, different routes of drug administration, toxic effects etc. 2. Students would have understood the pharmacological actions of different categories of drugs.

				<p>3. Mechanism of drug action at organ system, sub cellular and macromolecular levels have been studied.</p> <p>4. They have understood the application of basic pharmacological knowledge in the prevention and treatment of different diseases.</p> <p>5. Signal transduction mechanism of various receptors have been understood</p>
3 5	BP 405 T	PharmacognosyAndPhytochemistry I(Theory)	202 1	<p>This subject is intended to impart students about the fundamental knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially, involved in the study of producing plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine.</p> <ol style="list-style-type: none"> 1. Significance of pharmacognostic parameters & study of crude drugs. 2. Understand the underlying reason of evolutionary significance of secondary metabolites production in plants & other organisms & deduce their significance as medicinal molecules. 3. How these primary metabolites are used comprehensively as a source to develop Pharmaceutical & industrial applications. <p>Study about the source, name, chemical structures, methods of extraction, qualitative & quantitative analysis of glycosides & tannin.</p>
3 6	BP 406 P	Medicinal chemistry I (Practical)	202 1	<p>This subject is to inculcate the students will able to know</p> <ol style="list-style-type: none"> 1. Basic knowledge on scope of Medicinal chemistry and interlinked subjects 2. Handling the glassware and Preparations of the synthetic drugs and how to calibrate the chemicals. 3. Perform the synthesis of the drugs with their chemical structures. 4. Compare the test drug with that of the standard drug by assay methods. 5. Understand the partition coefficient of any two drugs.
3 7	BP 407 P	Physical pharmaceutics II (Practical)	202 1	<p>This course helps to compare and evaluate the solubility of various combination compound modify for better solubility approaches by use different level of methods</p>

3 8	BP 408 P	Pharmacology I (Practical)	202 1	<ol style="list-style-type: none"> 1. Handling of different instruments used in Experimental Pharmacology. 2. Know about the different routes of drug administration, blood withdrawal etc., 3. Evaluate the different activities on animals. Demonstration of different simulation methods
3 9	BP 409 P	Pharmacognosy and Phytochemistry (Practical)	202 1	<ol style="list-style-type: none"> 1. Demonstrate chemical tests to identify unorganized crude drugs 2. Evaluate the quality and purity of crude drugs 3. Perform linear measurements for crude drug identification
4 0	BP501T	MEDICINAL CHEMISTRY – II- Theory	202 1	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activityrelationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.
4 1	BP502T .	Industrial Pharmacy-I- Theory	202 1	Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product
4 1	BP503T .	PHARMACOLOGY-II- Theory	202 1	This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.
4 2	BP504T .	PHARMACOGNOSY AND PHYTOCHEMISTRY II- Theory	202 1	The main purpose of subject is to impart the students the knowledge of how these secondary metabolites is produced in the crude drugs, how to isolate and identify and produce them industrially. Also, this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine
4 3	BP505T	PHARMACEUTICAL JURISPRUDENCE- Theory	202 1	This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.
4 4	BP506P .	Industrial Pharmacy-I- Practical	202 1	This is help to understand the basic information of formulation process and how to optimise quality control solid, semisolid and parenteral dosage forms

4 5	BP507P	PHARMACOLOGY-II- Practical	202 1	<p>1. Handling of different instruments used in Experimental Pharmacology.</p> <p>2. Know about the different routes of drug administration, blood withdrawal etc.</p> <p>3. Evaluate the different activities on animals.</p> <p>4. Demonstration of different simulation methods.</p> <p>They would have finally learnt to apply the knowledge of drugs practically using simulated pharmacological experiments.</p>
4 6	BP508P .	PHARMACOGNOSY AND PHYTOCHEMISTRY II - Practical	202 1	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents by use chromatographic technique
4 7	BP601T .	MEDICINAL CHEMISTRY – III- Theory	202 1	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure activity relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer aided drug design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs
4 8	BP602T .	PHARMACOLOGY-III- Theory	202 1	This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immunopharmacology and in addition, emphasis on the principles of toxicology and chronopharmacology.
4 9	BP603T .	HERBAL DRUG TECHNOLOGY- Theory	202 1	This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs
5 0	BP604T .	BIOPHARMACEUTICS AND PHARMACOKINETICS- Theory	202 1	This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems raised therein
5 1	BP605T .	PHARMACEUTICAL BIOTECHNOLOGY - Theory	202 1	Biotechnology has a long promise to revolutionize the biological sciences and technology. Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting. Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs. Biotechnology has already produced transgenic crops and animals and the future promises lot more. It is basically a research-based subject.

5 2	BP606T .	PHARMACEUTICAL QUALITY ASSURANCE- Theory	202 1	This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs
5 3	BP607P .	MEDICINAL CHEMISTRY- III- Practical	202 1	This course helps to how to separation and identification compound given unknown mixture. It imparts take it knowledge on crude separation and identification technique
5 4	BP608 P.	PHARMACOLOGY-III- Practical	202 1	1. Handling of different instruments used in Experimental Pharmacology. 2. Know about the different routes of drug administration, blood withdrawal etc., 3. Evaluate the different activities on animals. 4. Demonstration of different simulation methods. 5. They would have finally learnt to apply the knowledge of drugs practically using simulated pharmacological experiments
5 5	BP609P .	HERBAL DRUG TECHNOLOGY-- Practical	202 1	This subject gives the student the knowledge of basic understanding of herbal drug formulation and determination of herbal content
5 6	BP701T	Instrumental Methods of Analysis (Theory)	202 1	1) To understand selected instrumental analytical techniques (spectroscopic and chromatographic methods) and differentiate with volumetric analysis. 2) To gain knowledge on interaction of EMR with matter and to build the analytical understanding at the level of atom, group and molecular structure of organic and inorganic compounds with different functional groups and their applications in pharmacy. 3) To maximize knowledge on characterization and estimation of ions by spectroscopical techniques 4) To simplify affinity of matter with stationary phase and mobile phase, physical and chemical. This subject is intended to impart students about the fundamental knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially, involved in the study of producing plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine.
5 7	BP702T	Industrial Pharmacy II (Theory)	202 1	1. This course is designed to impart knowledge and skills necessary to train the students to be on par with the routine of Industrial activities in Production. 2. On completion of this course, it is expected that students will be able to understand.

				3. Handle the scheduled activities in a pharmaceutical firm. Manage the production of large batches of pharmaceutical formulations
5 8	BP703T	Pharmacy Practice (Theory)	202 1	1. Understand the elements of pharmaceutical care and provide comprehensive patient care services 2. Interpret the laboratory results to aid the clinical diagnosis of various disorders. Provide integrated, critically analysed medicine and poison information to enable healthcare professionals in the efficient patient management
5 9	BP704T	Novel Drug Delivery System (Theory)	202 1	1. This subject is designed to impart basic knowledge on the area of novel drug delivery systems. Upon completion of the course student shall be able 2. To understand various approaches for development of novel drug delivery systems. 3. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation
6 0	BP705P	Instrumental Methods of Analysis (Practical)	202 1	1. Discusses the effect of impurities on the quality of drugs and behavioural pattern of drugs 2. Aids in understanding the SOP and usage of software associated with various analytical instruments 3. Helps in gaining knowledge of interpretation of spectra and of chromatograms
6 1	BP706P S	Practice School	202 1	1. Work in team and undertake a project in the area of Pharmacy 2. Present, exhibit and document the project work • Develop a project report 3. Apply concepts of pharmaceutical sciences for executing the project 4. Apply appropriate research methodology while formulating a project 5. Define specifications, synthesize, analyse, develop and evaluate a project
6 2	BP801T	Biostatistics and Research Methodology (Theory)	202 1	1. Develop the ability to apply the methods while working on a research project work 2. Describe the appropriate statistical methods required for a particular research design 3. Choose the appropriate research design and develop appropriate research hypothesis for a research project

				4. Develop a appropriate framework for research studies
6 3	BP802T	Social and Preventive Pharmacy (Theory)	202 1	1. After the successful completion of this course, the student shall be able to: Acquire high consciousness/ realization of current issues related to health and pharmaceutical problems within the country and worldwide. 2. Have a critical way of thinking based on current healthcare development. Evaluate alternative ways of solving problems related to health and pharmaceutical issues
6 4	BPH 409	Biopharmaceutics & Pharmacokinetics Practicals	202 1	1. Compare the in-vitro drug release profile of different marketed products 2. Perform the solubility enhancement techniques for improvement of drug release of poorly water-soluble drugs 3. Estimate the bioavailability (absolute and relative) and bioequivalence from the given clinical data 4. Calculate the drug content in blood sample using Area Under Curve approach 5. Calculate and interpret various pharmacokinetic parameters from the given clinical data
6 5	BP803E T	Pharma Marketing Management (Theory)	202 1	
6 6	BP804E T	Pharmaceutical Regulatory Science (Theory)	202 1	1. Explain the process of drug discovery, development and generic product development 2. Describe the regulatory approval process and registration procedures for API and drug products. 3. Basic understanding of regulations of India with other global regulated markets 4. Understand the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 5. Learn the basic understanding the importance of orange book, Federal Register, Code of Federal Regulatory, and purple book
6 7	BP805E	Pharmacovigilance	202 1	1. Explain the regulatory requirements for conducting clinical trial

	T	(Theory)		<ol style="list-style-type: none"> 2. Describe in detail about various types of clinical trial designs 3. Explain the responsibilities of key players involved in clinical trials 4. Describe the documentational requirements for Clinical trials 5. Explain Adverse drug reaction and its management
68	BP806E T	Quality Control and Standardization of Herbals (Theory)	2021	<ol style="list-style-type: none"> 1. Explain basic tests for drugs to obtain dosage form for pharmaceutical substances and medicinal plants 2. Explain methods for evaluation of pharmaceutical substances, medicinal plants and commercial crude drugs. 3. Describe guidelines for cGMP, GAP, GMP and GLP for quality assurance of herbal drugs in industry 4. Describe guidelines for quality control of herbal drugs and evaluation of safety and efficacy of herbal medicines. 5. Explain regulatory approval process and their registration in Indian and international markets.
69	BP807E T	Computer Aided Drug Design (Theory)	2021	<ol style="list-style-type: none"> 1. Explain the various stages of drug discovery and learn the concept of bioisosterism. 2. Describe physicochemical Properties and the techniques involved in QSAR 3. Explain various structure-based drug design methods (Molecular docking, Denovo drug design) 4. Learn the concept of pharmacophore and modelling techniques 5. Explain the various techniques in Virtual Screening
70	BP808E T	Cell and Molecular Biology (Theory)	2021	<ol style="list-style-type: none"> 1. It deals with understanding the molecular aspects of the biology. 2. It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription. 3. It also helps in understanding the concepts of cellular function

			<p>4. It deals with understanding the molecular aspects of the biology. It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription.</p> <p>It also helps in understanding the concepts of cellular function</p>
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	BP809ET	Cosmetic Science (Theory)	2021	<ol style="list-style-type: none"> 1. Cosmetic Science is an interdisciplinary applied science program providing students with the opportunities to develop professional skills and fundamental concepts driving cosmetic science. 2. Cosmetic Science focuses on the needs of the cosmetic industry and its consumers, in addition to providing students with the critical and evaluative skills to become professional scientists. 3. Cosmetic Science covers a range of sciences, both pure and applied, formulation development and industry operations, all of which give you a broad range of career opportunities.
	BP810ET	Experimental Pharmacology (Theory)	2021	<ol style="list-style-type: none"> 1. Study of commonly used instruments in experimental pharmacology. 2. Introduction to CPCSEA guidelines and OECD guidelines. 3. Introduction to animal physiology with their biochemical reference values in various animal species. 4. Study of methods for collection of blood, body fluids and urine from experimental animals.

				5. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).
	BP811ET	Advanced Instrumentation Techniques (Theory)	2021	<ol style="list-style-type: none"> 1. Apply the analytical techniques to study bulk-drug pharmaceuticals, quality control. 2. Develop in-depth knowledge and critical awareness of the application of modern. 3. Know preparation and standardization of various concentrations of acids and bases. 4. Understand the basic concepts involved in electro-analytical techniques and its types. 5. Understand theory, principle, types and techniques of coulometric titration
	BP812ET	Dietary Supplements and Nutraceuticals (Theory)	2021	<ol style="list-style-type: none"> 1. Know different Acts and guidelines that regulate Drugs & Cosmetics, Medical Devices, Biologicals & Herbals, and Food & Nutraceuticals industry in India. 2. Understand the approval process and regulatory requirements. 3. Drugs & Cosmetics, Medical Devices, Biologicals & Herbals, and Food & Nutraceuticals
	BP813PW	Project Work	2021	6. Work in team and undertake a project in the area of Pharmacy

				<p>7. Apply concepts of pharmaceutical sciences for executing the project</p> <p>8. Apply appropriate research methodology while formulating a project</p> <p>9. Define specifications, synthesize, analyse, develop and evaluate a project</p> <p>10. Present, exhibit and document the project work • Develop a project report</p>

M.Pharmacy

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MPH 101A(Pharmacology)	General & Systemic Pharmacology	2021	<p>6. Describe the instruments in experimental pharmacology.</p> <p>7. Know CPCSEA guidelines and OECD guidelines.</p> <p>8. Know animal physiology with their biochemical reference values in various animal species.</p> <p>9. Do collection of blood, body fluids and urine from experimental animals.</p> <p>10. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).</p>
2	MPH 102A(Pharmacology)	Clinical Pharmacology & Toxicology	2021	<p>1. The pathophysiology of selected disease states and the rationale for drug therapy.</p> <p>2. The controversies in drug therapy.</p>

				<ol style="list-style-type: none"> 3. The importance of preparation of individualized therapeutic plans based on diagnosis. 4. Understanding the concepts of Clinical research; Therapeutic drug monitoring (TDM) ; concepts of Pharmacotherapeutics, Management & Current Good Clinical Practice of various diseases. 5. Studying of various types, mechanisms of Drug interaction; rational for drug combinations; Drug Toxicity and its prevention; Adverse drug reactions and its monitoring
3	MPH 103	Practical 1	2021	<ol style="list-style-type: none"> 1. Recording of concentration response curve (CRC) of acetylcholine 2. Record of the CRC of 5-HT on rat fundus preparation. 3. Record of the CRC of histamine on guinea pig ileum 4. Inotropic and chronotropic effects of drugs on isolated frog heart
4	MPH 104	Practical-II(MAT)	2021	<ol style="list-style-type: none"> 1. Explains the importance of modern instrumentation in pharmaceutical analysis 2. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms

5	MPH 105	Modern Analytical Techniques and biostatics Theory	2021	<ol style="list-style-type: none"> 1. Explains the importance of modern instrumentation in pharmaceutical analysis 2. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms. <p>Explains the concepts of Statistics and their applications in pharmacy</p>
6.	MPH 106	Human Values and Professional Ethics-I	2021	<ol style="list-style-type: none"> 1. Awareness of ethical issues and basic ethical approaches. 2. Improved writing skills and understanding of ethical conflict. 3. Enables students to develop ability for moral reasoning and act with ethical deliberations. 4. After studying ethics one is equipped with the ethical sensitivity and moral understanding required to solve complex ethical dilemmas. 5. Learn how to live peacefully
7.	MPH 107	Comprehensive Viva	2021	<ol style="list-style-type: none"> 1. Know the fundamental knowledge on the structure and functions of the various systems of the human body. 2. understanding all the homeostatic mechanisms of the body 3. Understand the relationship of anatomy with various disciplines of pharmacy.

				4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition
8.	MPH 201A (Pharmacology)	Molecular Pharmacology	2021	<ol style="list-style-type: none"> 1. Explain the modes of action of drug at the cellular level by describing their interactions with target proteins 2. Explain the receptor signal transduction processes. 3. Explain the molecular pathways affected by drugs. 4. Understanding the applicability of molecular pharmacology and biomarkers in drug discovery process. 5. Outline the molecular features that are responsible for agonist and antagonist binding, and coupling to effector processes, with reference to the nicotinic, muscarinic, and β-adrenergic receptors
9.	MPH 202 A	Methods in Drug Evaluation	2021	<ol style="list-style-type: none"> 1. Know the commonly used instruments in experimental pharmacology. 2. describe the animal physiology with their biochemical reference values in various animal species. 3. Study of methods for collection of blood, body fluids and urine from experimental animals. 4. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).
10.	MPH 203	Practical 1	2021	<ol style="list-style-type: none"> 1. Calculation of the PA_2 Calculate the PA_2 Value 2. Interpolation bioassay

				<ol style="list-style-type: none"> 3. Matching or bracketing bioassay 4. Three point bioassay 5. Four point bioassay
11	MPH 204	Practical-II(BPK)	2021	<ol style="list-style-type: none"> 1. Compare and differentiate between compartmental and non compartmental analysis 2. Identify the physiological, Physicochemical and dosage form related factors that affects drug absorption from different dosage forms 3. Examine the absolute and relative bioavailability of drugs form different dosage forms using either plasma or urine data. 4. Compare the bioequivalence of two drug products
12	MPH 205	BIO-PHARMACEUTICS & PHARMACOKINETICS	2021	<ol style="list-style-type: none"> 1. Understand the concept of ADME of drug in human body. 2. Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug 3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule
13	MPH 206	Human Values and Professional Ethics-II	2021	<ol style="list-style-type: none"> 1. Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field 2. Learn about morals, values & work ethics. 3. Develop commitment

				<ol style="list-style-type: none"> 4. Learn about the different professional roles. 5. Ethical, social and environmental awareness 6. Professional rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct
14	MPH 207	Comprehensive Viva	2021	
15	MPH 301	Mid-Term Evaluation of Research project	2021	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups. 5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.
16	MPH 401	Project thesis submission & presentation and Project Viva voce	2021	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects

				<p>are undertaken individually or in small groups.</p> <p>5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.</p>
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S.V.U.COLLEGE OF ENGINEERING

Chemical Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA 101	MATHEMATICS –I	2021	<ol style="list-style-type: none"> 1. analyze differential equations and solve them 2. apply differential equations to engineering problems. 3. Use transformation to convert one type into another type presumably easier to solve. 4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients. 5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform. 6. expand functions as power series using Maclaurin's and Talor's series 7. optimize the problems related to OR, Computer science, Probability and Statistics 8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions enclosing curve tracing method to find length, area,

				<p>volume.</p> <p>9. use multiple integral in evaluating area and volume of any region bounded by the given curves.</p>
2	CY102	Chemistry for Chemical Engg.-1	2021	<ol style="list-style-type: none"> 1. analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. 2. rationalize bulk properties and processes using thermodynamic considerations. 3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques 4. rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. 5. list major chemical reactions that are used in the synthesis of molecules.
3	EN103	English	2021	<ol style="list-style-type: none"> 1. learn the elements of grammar and composition of English Language. 2. Learn literary texts such as Short stories and prose passages. 3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation. 4. develop communication skills by cultivating the habit of reading comprehension passages. 5. develop the language skills like listening, speaking, reading and writing. <p>Make use of self-instructed learner friendly modes of language learning through competence</p>
4	EE104	Basic Electrical and Electronics Engineering	2021	<ol style="list-style-type: none"> 1. understand the basic concepts of D.C. single phase and 3- phase supply and circuits and solve

				<p>basic electrical circuit problems</p> <ol style="list-style-type: none"> 2. understand the basic concepts of transformers and motors used as various industrial drives 3. understand the concept of power factor improvement for industrial installations and concepts of most economical power factor 4. understand the operation and characteristics of diodes, transistors, integrated circuits and digital circuits.
5	ME105	Engineering Graphics and Design	2021	<ol style="list-style-type: none"> 1. make a distinction between first angle projection and third angle projection of drawing. 2 draw hyperbola, parabola, Involutives and Cycloidal curves. 3. draw sections of solids including cylinders, cones, prisms and pyramids. 4. draw projections of lines, planes, solids and sections of solids. <p>draw orthographic projections of lines, planes, and solids.</p>
6	EN106	English Communication Lab	2021	<ol style="list-style-type: none"> 1. use ranks of matrices to decide whether the system of linear equations is consistent or not 2. use Cayley-Hamilton theorem to find inverses or powers of matrices. 3. use Eigen values and vectors to reduce Quadratic forms to normal form. 4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications. 5. use Green's theorem to evaluate line integrals along simple closed contours on the plane

				<p>6. use Stokes' theorem to give a physical interpretation of the curl of a vector field</p> <p>7. use the divergence theorem to give a physical interpretation of the divergence of a vector field.</p> <p>8. find the Fourier Series to represent a function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic phenomenon.</p> <p>9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions.</p> <p>10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena.</p>
7	MA 201	Mathematics - II	2021	<p>1. use ranks of matrices to decide whether the system of linear equations is consistent or not</p> <p>2. use Cayley-Hamilton theorem to find inverses or powers of matrices.</p> <p>3. use Eigen values and vectors to reduce Quadratic forms to normal form.</p> <p>4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. use Green's theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. use Stokes' theorem to give a physical interpretation of the curl of a vector field</p> <p>7. use the divergence theorem to give a physical interpretation of the divergence of a vector field.</p> <p>8. find the Fourier Series to represent a</p>

				<p>function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic phenomenon.</p> <p>9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions.</p> <p>10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena.</p>
8	PY 202	Engineering Physics	2021	<ol style="list-style-type: none"> 1. Develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses 2. understand the quantum mechanics and ultimately the quantum behavior of charged particles when they are in motion. 3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems 4. apply the basic principles of Mechanics of rigid body and continuous media and their applications understand the principles in electrostatics and electromagnetics and magnetic properties of materials. 5. understand size depended properties of nano-dimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices. 6. think and participate deeply, creatively, and analytically in emerging areas of engineering technology. 7. Learn the basics of instrumentation, design

				of laboratory techniques, measurement, data acquisition, interpretation, and analysis. 8. provide multidisciplinary experiences throughout the curriculum.
9	CS 203	Program for Problem Solving	2021	<ol style="list-style-type: none"> 1. Develop and test programs in C and correct syntax and logical errors. 2. Implement conditional branching, iteration and recursion. 3. Decompose a problem into functions and synthesize a complete program. 4. Use arrays, pointers, strings and structures to formulate algorithms and programs 5. Use files to perform read and write operations. 6. Handle programming assignments based on class, abstraction, encapsulation, overloading and inheritance.
10	CY 204	Chemistry for Chemical Engg.-II	2021	<ol style="list-style-type: none"> 1. apply the basic knowledge of force system. 2. know the types of supports occur in civil engineering structures 3. know the geometrical properties of different cross sections. 4. understand different types of stresses and strains, elastic constants. 5. understand the behavior of different internal forces under different types of loading.
11	ME 205	Workshop/Manufacturing Practices	2021	Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.
12	CS 206	Program for Problem Solving Lab	2021	<ol style="list-style-type: none"> 1. Develop the C code for the given algorithm. 2. Understand, debug and trace the execution of programs written in C language.

13	CE 207	Environmental Science	2021	<p>1. acquire knowledge in</p> <ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> diverse components of environment and natural resources <input type="checkbox"/> <input type="checkbox"/> ecosystem and biodiversity & its conservation methods <input type="checkbox"/> <input type="checkbox"/> population growth and human health <input type="checkbox"/> <input type="checkbox"/> green technology <p>2. identify and resolve the issues related to sources of different types of pollutions</p> <p>3. provide solutions to individuals, industries and government for sustainable development of natural resources</p> <p>4. apply environmental ethics in protection of diversified ecosystems.</p>
14	MA301 B	Mathematics - III	2021	<p>Applying various statistical models and methods for drawing conclusions and making decisions under uncertainty in engineering contexts</p> <p>2 Apply statistical and numerical methods in various computer science related projects, seminars and research</p> <p>3 Apply the knowledge of iterative methods to solve algebraic and transcendental equations, simultaneous linear equations, ODE (ordinary differential equations)</p> <p>4 Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration</p> <p>5 Demonstrate a basic knowledge of the techniques for accurate and efficient solution of models based on linear and nonlinear systems of equations, ordinary differential equations and partial differential equations.</p>

15	CH302 E	Engineering and Solid Mechanics	2021	<ol style="list-style-type: none"> 1. Learn about the elastic and plastic behavior of material and evaluate stress invariants, principal stresses and their directions. 2. Euler's Axioms, Free Body Diagrams, Dynamics of point mass models of bodies. 3. Shear Force and Bending Moment 4. Principal Moments of Inertia, Moment of momentum relations for rigid bodies, Euler's Equations of Motion. 5. Concept of strain, strain displacement relations, compatibility conditions, Uniaxial stress and strain analysis of bars.
16	HS303 C	Managerial Economics and Accountancy	2021	<p>Understand Macro Economic environment of the business and its impact on enterprise.</p> <p>Identify various cost elements of the product and its effect on decision making.</p> <p>Understand the concepts of financial management and smart investment.</p> <p>Prepare the Accounting records and interpret the data for Managerial Decisions.</p>
17	CH304 C	Chemical Process Calculations	2021	<ol style="list-style-type: none"> 1. To understand the dimension-unit systems and their inter relationships, to be able to represent mixture compositions in different forms and to be able to make calculations using reaction stoichiometry. 2. To be able to make mass balance calculations for different operations, without reaction, its mathematical form and its application to different operations and reactions. 3. To be able to make mass balance calculations for different operations, with reaction, its mathematical form and its application to different operations and reactions.

				<p>4. To have learnt the significance of vapor pressure and its dependence and to have learnt different representations of partial saturation and to apply ideal gas law in conjunction with variation in levels of saturation.</p> <p>5. To be able to estimate parameters like oxygen requirement, flue gas analysis, energy released and flame temperatures.</p>
18	CH305 C	Momentum Transfer	2021	<p>1. To be able to perform dimensional analysis of fluid flow problems and develop pressure drop equations for fluid static equipments in which fluid is at rest.</p> <p>2. To have the knowledge on different types of flow regions in fluid flow, rheological properties of fluids, turbulence and boundary layers.</p> <p>3. To be able to carry out macroscopic mass, momentum and energy balance to solve engineering problems related to fluid flow and to analyze flow past solid surface, through packed bed and in fluidized beds.</p> <p>4. Determine the minimum fluidization velocity and terminal velocity of the fluid in Stokes and Newton's law regions.</p> <p>5. The analysis of fluid flow measuring devices like Orifice meter, Venturimeter, Rotameter and Pitot tube, the construction and working of Centrifugal and reciprocating pumps. And also give the knowledge on different types of valve, selection of pipe and fittings.</p>
19	CH306 C	Chemical Engineering Thermodynamics - I	2021	<p>1. To have learnt the fundamental ideas about energy, equilibrium and reversibility. To be able to apply first law to estimate heat and work effects in closed, open and flow</p>

				<p>systems.</p> <p>2. To understand PV and PT phase diagrams, ideal gas law and its applications. To be able to estimate heat and work effects for different processes – isothermal, isobaric, isometric, and adiabatic processes.</p> <p>3. To be to apply second law of thermodynamics to estimate efficiency of a cycle. To have understood the concept of entropy and its estimation.</p> <p>4. To have learnt different refrigeration cycles and also to be able to calculate their COP.</p> <p>5. To have learnt the thermodynamic analysis of flow processes.</p>
20	CH307 L	Momentum Transfer Lab	2021	<p>a) The study and use of MS WORD, MS EXCEL , POWER POINT AND Google Forms with their utilization in Chemical engineering project works and personal works</p>
21	MC310 A	Constitution of India	2021	<p>a) Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.</p> <p>b) Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</p> <p>c) Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</p> <p>Discuss the passage of the Hindu Code Bill of</p>

				1956.
22	CH401 B	Mathematics - IV	2021	<ol style="list-style-type: none"> 1. After the completion of course, students will be able to apply numerical methods to solve all type of equations. 2. Derive interpolating polynomials using interpolation formulae. 3. Solve integral equations numerically. 4. Analyse the data and develop skills to solve Algebraic & Transcendental Equations. 5. Derive numerical methods solution of differential equations.To find the Solution of Linear And Non-Linear Algebraic Equations.
23	CH402 C	Particle and Fluid Processing	2021	<ol style="list-style-type: none"> 1. To be able to determine the Volume surface mean diameter, mass mean diameter, number of particles and types of mixers. 2. To have the knowledge of different types of Crushers, grinders, ultrafine grinders, cutters, to be able to find the power requirement using three crushing laws. 3. To be able to calculate the screening effectiveness .To have understood settling processes and flotation technique. 4. To develop the rate equations for constant pressure and constant volume filtration techniques and also to solve the problems related to these techniques.To have acquired the construction and operation of different filtration, settling and clarifying equipment. 5. To understand the functioning of agitated vessels and to calculate the power consumption.To have the knowledge on different types of turbines, blending and mixing.

24	CH403 C	Chemical Engineering Thermodynamics - II	2021	<p>1. To be able to develop and use expressions for property estimation. To be able to calculate property values from equations of state.</p> <p>2. To have learnt the concepts of residual, excess, partial molar properties and property changes of mixing. To have understood concepts of ideal solutions, fugacity and activity coefficient.</p> <p>3. To be able to use modified forms of Raoult's law for non-ideal systems, Dewpoint and bubble point calculations.</p> <p>4. To be able to make phase equilibrium calculations using Raoult's law. To have learnt the concepts of LLE and VLLE.</p> <p>5. To have learnt the concept of equilibrium constant and its calculation. To be able to estimate equilibrium conversion of single and simple multiple reactions.</p>
25	CH404 C	Heat Transfer	2021	<p>1. To be able to calculate the heat transfer flux in one-dimensional heat conduction .To have learnt the concepts of turbulence, boundary layer and analogies.</p> <p>2. To have understood the construction and flow patterns in heat exchange equipment.</p> <p>3. To be able to calculate heat flux in natural convection. To be able to estimate heat flux in forced convection.</p> <p>4. To have understood the concepts of black body, view factors and to be able to calculate radiation heat flux. To be able to handle conduction-convection conduction-convectionradiation heat transfer.</p>

				5. To be able to design heat exchangers and condensers. To have understood the functioning of evaporators.
26	CH405 C	Mass Transfer Operations - I	2021	<p>1. To be able to calculate the flux in cases involving diffusive transfer. To appreciate the contribution of turbulence to transfer and to calculate coefficients and from them, the flux.</p> <p>2. To be able to differentiate different representations of resistances and to properly integrate them to obtain the overall resistance. To be able to estimate the process parameters like solvent requirement, number of theoretical stages, height and diameter of columns.</p> <p>3. To understand equilibrium relevant to absorption and to calculate the number of stages, number and height of transfer units.</p> <p>4. To understand the equilibrium concerned to humidification, various methods of conducting the operation and to design a cooling tower.</p> <p>5. To understand the mechanism of drying operation and to calculate the time of drying.</p>
27	CH406 C	Chemical Technology	2021	<p>1. Able to differentiate unit operations and unit processes. To Know the basic principles of different unit operations. Able to know constituents of petroleum, and the extraction of petroleum compounds petrol, diesel</p> <p>2. Can understand the raw materials and production of Ammonia, Urea, Phosphorus industries.</p> <p>3. Can understand the raw materials, pulp and paper industry, reactions involved and the production of sugar, starch.</p>

				<p>4. Get knowledge about alcohol, soaps, edible oils, hydrogenation of oils and extraction of vegetable oils.</p> <p>5. Can understand the difference between paints and varnishes and about the production. Know the classification of plastics, industrial production of plastics and rubbers.</p>
28	CH409 S	Python Programming	2021	<p>a) Understand the structure, syntax, and semantics of the Python language.</p> <p>b) Interpret the concepts of Object-Oriented Programming as used in Python.</p> <p>c) Demonstrate proficiency in handling Strings and File Systems.</p> <p>d) Implement desktop/Web-based applications using the Python programming language.</p> <p>e) Boost hireability through innovative and independent learning.</p>

Chemical Engineering M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CHPC 01	Mathematics & Statistical Methods in Chemical Engineering	2021	<p>1. Students should be able to solve system of linear algebraic equations</p> <p>2. Students should be able to do numerical integrations of functions.</p> <p>3. Students should be able to fit relationship between two data sets using linear, non-linear regression.</p> <p>4. Students should be able to calculate maxima/minima and functions</p>
2	CHPC 02	Advanced Transport Phenomena	2021	<p>1. Understand the mechanism of momentum, heat and mass transport for steady and unsteady flow.</p> <p>2. Perform momentum, energy and mass</p>

				<p>balances for a given system at macroscopic and microscopic scale.</p> <p>3. Solve the governing equations to obtain velocity, temperature and concentration profiles.</p> <p>4. Model the momentum, heat and mass transport under turbulent conditions.</p> <p>5. Develop analogies among momentum, energy and mass transport.</p>
3	CHPE 11	Process Design & Synthesis	2021	<p>1. Analyze alternative processes and equipment</p> <p>2. Synthesize a chemical process flow sheet that would approximate the real process</p> <p>3. Design best process flow sheet for a given product</p> <p>4. Perform economic analysis related to process design and evaluate project profitability</p>
4	CHPE 12	Chemical Reactor Analysis	2021	<p>1. Evaluate heterogeneous reactor performance considering mass transfer limitations</p> <p>2. Perform the energy balance and obtain concentration profiles in multiphase reactors.</p> <p>3. Estimate the performance of multiphase reactors under non-isothermal conditions</p>
5	CHPE 13	Fluidization Engineering	2021	<p>1. Performing and understanding the behavior fluidization in fluidized bed</p> <p>2. Evaluate the characterization of particles and power consumption in fluidization regimes</p> <p>3. Understanding the applicability of the fluidized beds in chemical industries</p>
6	CHPE 14	Process Plant Simulation	2021	<p>1) Modeling Aspects and Classification of Mathematical Modeling</p> <p>2) How to Prepare Models from Mass Transfer and Models on Heat Transfer</p> <p>3) How to Prepare Models from Fluid Flow</p>

				<p>and Models on Reaction Engineering</p> <p>4) The analysis through Propagation of Errors, Error Methods, Data Regression Methods and Process Simulation</p> <p>5) Decomposition of Networks and Convergence Promotion</p>
7	CHPE 21	Industrial Pollution Control	2021	<ol style="list-style-type: none"> 1. Recognize the causes and effects of environmental pollution 2. Analyze the mechanism of proliferation of pollution 3. Develop methods for pollution abatement and waste minimization 4. Design treatment methods for gas, liquid and solid wastes
8	CHPE 22	Applications of Nanotechnology in Chemical Engineering	2021	<ol style="list-style-type: none"> 1. Understanding the different top down and bottom up approaches for nanoparticles 2. Get to know the different applications of nanoparticles in chemical engineering field. 3. Learning the characterization techniques for nanoparticles
9	CHPE 23	Chemo-informatics	2021	<ol style="list-style-type: none"> 1. The course will introduce the students preparing for professional work in chemistry must learn how to retrieve specific information from the enormous and rapidly expanding chemical literature. 2. The course will provide a broad overview of the computer technology to chemistry in all of its manifestations. 3. The course will expose the student to current and relevant applications in QSAR and Drug Design.
10	CHPE 24	Advanced Control Systems	2021	<ol style="list-style-type: none"> 1) Feed Forward, Ratio Controls and Advanced Controllers 2) Control Loop Interactions & Optimization

				<p>3) Digital Computer Control, selection of sampling period, comparison of analog and digital filters</p> <p>4) Finite Difference Models, Z-Transforms, Pulse Transfer Functions</p> <p>5) Samples and Data Control Systems</p>
11	CHPP 01	Computational Techniques Lab	2021	<p>1. Use numerical methods for various manipulations and be capable of implementing them on a computing system</p>
12	PGPA 14	Value Education	2021	<p>1. Knowledge of self-development</p> <p>2. Learn the importance of Human values</p> <p>3. Developing the overall personality</p>
13	CHPC 03	Separation Techniques	2021	<p>1) Applies the concepts of diffusion mass transfer, mass transfer coefficients, convective mass transfer, inter-phase mass transfer, equipment for gas-liquid operations</p> <p>2) Suggest and design equipment for various mass transfer operations</p> <p>3) Study of the stage wise mass transfer operations, principles of various stage wise contact processes like distillation</p> <p>4) Student will be able to select a separation process for a particular system.</p> <p>5) Able to understand the energy requirements of separation processes</p>
14	CHPC 04	Chemical Reactor Theory	2021	<p>1) learn the importance of RTD and Non-ideal flow in reacting vessels.</p> <p>2) Calculate the conversions based on segregated flow model, dispersion model and tanks-in-series models.</p> <p>3) Understand the diffusion and reaction in a porous catalyst.</p> <p>4) Learn the factors influencing catalyst</p>

				decay, the role of pore diffusion on catalyst activity rate. 5) Understand the design of heterogeneous catalytic reactors.
15	CHPE 31	Modern Concepts in Catalysis & Surface Phenomenon	2021	<ol style="list-style-type: none"> 1. To understand the concepts of homogenous and heterogeneous catalysis, with specific examples. 2. To study reaction mechanisms and kinetics of homogenous and heterogeneous catalytic reactions. 3. To familiarize with the characterization of catalysts 4. To understand the application and mechanisms of several types of catalysts in chemical industry.
16	CHPE 32	Advanced Downstream Processing	2021	<ol style="list-style-type: none"> 1. To learn effective strategies of downstream processing in chemical industry. 2. Understand the role of downstream processing. 3. Analyze reactors, upstream and downstream processes in production
17	CHPE 33	Computational Fluid Dynamics	2021	<ol style="list-style-type: none"> 1. Understand the basic principles of mathematics and numerical concepts of fluid dynamics. 2. Develop governing equations for a given fluid flow system. 3. Adapt finite difference techniques for fluid flow models. 4. Apply finite difference method for heat transfer problems. 5. Solve computational fluid flow problems using finite volume techniques. 6. Get familiarized to modern CFD software used for the analysis of complex fluid-flow

				systems
18	CHPE 34	Enzyme Science & Engineering	2021	<ol style="list-style-type: none"> 1) Know the mechanisms of Chemical and Enzyme Catalysts 2) Develop, understand and apply Kinetic Models 3) Formulate and Analyze Immobilized Enzyme Kinetics 4) Design and analyze Enzyme Reactors 5) Gain knowledge on Applications of Enzyme and on Biosensors
19	CHPE 35	Optimization Theory & Practice	2021	<ol style="list-style-type: none"> 1) formulate and analyse the optimization of the given physical situation. 2) Apply different methods of optimization and to suggest a technique for specific problem 3) Understand the difference between constrained and unconstrained optimization 4) Understand the importance of linear programming problems 5) Realize the importance of optimization by understanding different examples
20	CHPE 36	Micro and Nano Fluidics	2021	<p>1. Introduce students to the physical principles to analyze fluid flow in micro and nano-size devices. It unifies the thermal sciences with electrostatics, electrokinetics, colloid science; electrochemistry; and molecular biology.</p>
21	CHPE 37	Process Intensification	2021	<ol style="list-style-type: none"> 1. Assess the values and limitations of process intensification, cleaner technologies and waste minimization options. 2. Measure and monitor the usage of raw materials and wastes generating from production and frame the strategies for reduction, reuse and recycle. 3. Obtain alternative solutions ensuring a

				<p>more sustainable future based on environmental protection, economic viability and social acceptance.</p> <p>4. Analyze data, observe trends and relate this to other variables.</p> <p>5. Plan for research in new energy systems, materials and process intensification.</p>
22	CHPE 41	Phase Transitions in Process Equipment	2021	<p>1. The student is expected to obtain considerable insight into various types of phase transitions, and how these can be described theoretically in different ways</p> <p>2. Predict relationships between physical quantities using the laws and methods of thermodynamics.</p> <p>3. Find probabilities and thermal quantities (free energy, entropy, etc) given the energy eigen values of a system.</p> <p>4. The student is expected to obtain considerable insight into various types of phase transitions, and how these can be described theoretically in different ways</p> <p>5. Predict relationships between physical quantities using the laws and methods of thermodynamics.</p> <p>6. Find probabilities and thermal quantities (free energy, entropy, etc) given the energy eigen values of a system.</p>
23	CHPE42	Process Integration	2021	<p>1. Maximum heat recovery for a given process (both new processes, and retrofit of existing processes) identify opportunities for integration of high-efficiency energy.</p> <p>2. Energy-intensive thermal separation operations (distillation, evaporation) at an industrial</p>

				<p>process site.</p> <p>3. Evaluate the process integration measures with respect to energy efficiency, greenhouse gas emissions and economic performance.</p>
24	CHPE 43	Transport in Porous Media	2021	<p>1. Students will understand the mechanisms involved in transport processes in porous media and will be able to work with the equations that govern the fate and transport of gas, water and solutes in porous media.</p>
25	CHPE 44	Microflow Chemistry & Process Technology	2021	<p>1. Students will understand the role of micro flow chemistry and process technology in chemical engineering.</p> <p>2. The student is expected to obtain considerable insight into various types of micro reactors.</p>
26	CHPE 45	Process Plant Design & Flow sheeting Tools	2021	<p>1. Analyze, synthesize and design processes for manufacturing products commercially</p> <p>2. Integrate and apply techniques and knowledge acquired in other courses such as thermodynamics, heat and mass transfer, fluid mechanics, instrumentation and control to design heat exchangers, plate and packed columns and engineering flow diagrams</p> <p>3. Use commercial flow sheeting software to simulate processes and design process equipment</p> <p>4. Recognize economic, construction, safety, operability and other design constraints</p> <p>5. Estimate fixed and working capitals and operating costs for process plants</p>
27	CHPE 46	Process Synthesis & Analysis	2021	<p>1) understand the concepts of Engineering economics</p> <p>2) Able to estimate various costs involved in a process industry and evaluate the tax burden of</p>

				<p>an establishment</p> <p>3) Able to estimate profitability of a company</p> <p>4) Understand the heat exchanger networks and their importance in industry</p> <p>5) Compute break even period for an investment and rate of return</p>
28	CHPE 47	Membrane Separations	2021	<p>1) Knowledge on Preparation and Characterization of Materials and Types of Membrane</p> <p>2) Knowledge on Nano-Filtration, Ultra-Filtration and Micro-Filtration</p> <p>3) Knowledge on Designing Reverse Osmosis and Dialysis</p> <p>4) Concepts of Gas Separation and Pervaporation and Design of Pervaporation Module</p> <p>5) Knowledge on Ion Exchange Membrane Process, Liquid Membranes and Other Membrane Processes</p>
29	CHPP 02	Advanced Chem. Engg. Lab	2021	<p>1. to design and perform Chemical Engineering related experiments</p>
30	PGPA 21	Constitution of India	2021	<p>1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.</p> <p>2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</p> <p>3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</p>

				4. Discuss the passage of the Hindu Code Bill of 1956
31	PGPA 22	Pedagogy Studies	2021	<p>1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</p> <p>2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</p> <p>3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</p>
32	PGPA 23	Stress Management by Yoga	2021	<p>1. Develop healthy mind in a healthy body thus improving social health also</p> <p>2. Improve efficiency</p>
33	PGPA 24	Personality Development through Life Enhancement Skills	2021	<p>1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life</p> <p>2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity</p> <p>3. Study of Neetishatakam will help in developing versatile personality of students.</p>
34	CHPE 51	Design of Experiments & Parameter Estimation	2021	<p>1. Plan experiments for a critical comparison of outputs</p> <p>2. Include statistical approach to propose hypothesis from experimental data</p> <p>3. Implement factorial and randomized sampling from experiments</p> <p>4. Estimate parameters by multi-dimensional optimization</p>
35	CHPE 52	Computer Aided Design	2021	<p>1. Students get the knowledge about computer Aided Flow Sheet Synthesis</p> <p>2. Computer aided equipment design of</p>

				Evaporators; Distillation columns; Reactors, adsorption columns.
36	CHPE 53	Cleaner Production	2021	<ol style="list-style-type: none"> 1. Explain the concept and principles of cleaner production. 2. Suggest different unit operations in industrial production process to minimize pollutions. 3. Plan good housekeeping practices for Industry/other places with concern of safety, hygiene and waste reduction. 4. Suggest basic methods and techniques of pollution prevention during production. 5. Suggest cleaner production methods for a given situation which will also lead to cost reduction in long run
37	CHPE 54	Fuel Cell Systems	2021	<ol style="list-style-type: none"> 1) Classify Fuel Cells, and understand factors affecting efficiency of electrochemical energy 2) Construct, operate AFC & MCFC 3) Gain knowledge on manufacturing and materials, environmental impacts and applications of PAFC & SOFC 4) Gain knowledge on electrode- oxidation of methanol and crossover to DMF and Engineering Aspects 5) Gain knowledge on Technological and Economical Challenges on PEMFC
38	CHPE 56	Bioprocess Engineering	2021	<ol style="list-style-type: none"> 1. Understand the different cells and their use in biochemical processes. 2. Understand the role of enzymes in kinetic analysis of biochemical reaction. 3. Analyze bioreactors, upstream and downstream processes in production of bio-products 4. Demonstrate the fermentation process and its products for the latest industrial

				revolution
39	PGOP 11	Business Analytics	2021	<ol style="list-style-type: none"> 1. Students will demonstrate knowledge of data analytics. 2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics. 3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. Students will demonstrate the ability to translate data into clear, actionable insights

Civil Engineering B.Tech

S.No .	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA101	Mathematics–I	2021	<ol style="list-style-type: none"> 1. analyzedifferentialequationsandsolve them 2. applydifferentialequationstoengineering problems. 3. Usetransformation toconvertontypeintoanothertypepresumablyeasierto solve. 4. useshifttheoremstocomputetheLaplacetransform,inverseLaplace transformandthe solutions of second order, linear equations with constant coefficients. 5. solvean initial value problem for an n^{th} orderordinarydifferential equation using theLaplace transform. 6. expandfunctionsaspowerseriesusingMaclaurin’sandTalor’s series 7. optimizetheproblemsrelatedtoOR,Computerscience,Probabilityand Statistics 8. drawanapproximateshapebythestudyofsomeofitsimportantcharacteristicssuchas symmetry, tangents, regions enclosing curve tracing method to find length, area, volume.

				9. use multiple integral line evaluating area and volume of any region bounded by the given curves.
2	CY101	Engg. Chemistry	2021	<ol style="list-style-type: none"> 1. analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. 2. rationalize bulk properties and processes using thermodynamic considerations. 3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques 4. rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. 5. list major chemical reactions that are used in the synthesis of molecules.
3	EN103	English	2021	<ol style="list-style-type: none"> 1. learn the elements of grammar and composition of English Language. 2. Learn literary texts such as Short stories and prose passages. 3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation. 4. develop communication skills by cultivating the habit of reading comprehension passages. 5. develop the language skills like listening, speaking, reading and writing. 6. Make use of self-instructed learner friendly modes of language learning through competence.
4	EE104	Basic Electrical & Electronics Engineering	2021	<ol style="list-style-type: none"> 1. understand the basic concepts of D.C. single phase and 3- phase supply and circuits and solve basic electrical circuit problems 2. understand the basic concepts of transformers and motors used as various industrial drives 3. understand the concept of power factor improvement for industrial installations and concepts of most economical power factor 4. understand the operation and characteristics of diodes, transistors, integrated circuits and digital circuits
5	ME105	Engineering Graphics and	2021	<ol style="list-style-type: none"> 1. make a distinction between first angle projection and third angle projection of drawing.

		Design		<p>2 draw hyperbola, parabola, Involutives and Cycloidal curves.</p> <p>3. draw sections of solids including cylinders, cones, prisms and pyramids.</p> <p>4. draw projections of lines, planes, solids and sections of solids.</p> <p>5. draw orthographic projections of lines, planes, and solids.</p>
6	EN 106	English Communication Lab	2021	The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
7	MA201	Mathematics–II	2021	<p>1. use ranks of matrices to decide whether the system of linear equations is consistent or not</p> <p>2. use Cayley-Hamilton theorem to find inverses or powers of matrices.</p> <p>3. use Eigen values and vectors to reduce Quadratic forms to normal form.</p> <p>4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. use Green’s theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. use Stokes’ theorem to give a physical interpretation of the curl of a vector field</p> <p>7. use the divergence theorem to give a physical interpretation of the divergence of a vector field.</p> <p>8. find the Fourier Series to represent a function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic phenomenon.</p> <p>9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions.</p> <p>10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena.</p>
8	PY202	Engineering Physics	2021	<p>1. Develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses</p> <p>2. understand the quantum mechanics and ultimately the quantum behavior of charged particles when they are in motion.</p>

				<p>3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems</p> <p>4. apply the basic principles of Mechanics of rigid body and continuous media and their applications understand the principles in electrostatics and electromagnetics and magnetic properties of materials.</p> <p>5. understand size depended properties of nano-dimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices.</p> <p>6. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.</p> <p>7. Learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.</p> <p>8. provide multidisciplinary experiences throughout the curriculum.</p>
9	CS203	Programming for Problem Solving	2021	<p>1. Develop and test programs in C and correct syntax and logical errors.</p> <p>2. Implement conditional branching, iteration and recursion.</p> <p>3. Decompose a problem into functions and synthesize a complete program.</p> <p>4. Use arrays, pointers, strings and structures to formulate algorithms and programs</p> <p>5. Use files to perform read and write operations.</p> <p>6. Handle programming assignments based on class, abstraction, encapsulation, overloading and inheritance.</p>
10	CE 204	Engineering Mechanics	2021	<p>1. apply the basic knowledge of force system.</p> <p>2. know the types of supports occur in civil engineering structures</p> <p>3. know the geometrical properties of different cross sections.</p> <p>4. understand different types of stresses and strains, elastic constants.</p> <p>5. understand the behavior of different internal forces under different types of loading.</p>
11	ME205	Workshop / Manufacturing Practices	2021	<p>Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to</p>

				fabricate components using different materials.
12	CS206	Programming for Problem Solving Lab	2021	<ol style="list-style-type: none"> 1. Develop the C code for the given algorithm. 2. Understand, debug and trace the execution of programs written in C language.
13	CE 207	Environmental Science	2021	<ol style="list-style-type: none"> 1. acquire knowledge in <ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> diverse components of environment and natural resources <input type="checkbox"/> <input type="checkbox"/> ecosystem and biodiversity & its conservation methods <input type="checkbox"/> <input type="checkbox"/> population growth and human health <input type="checkbox"/> <input type="checkbox"/> green technology 2. identify and resolve the issues related to sources of different types of pollutions 3. provide solutions to individuals, industries and government for sustainable development of natural resources 4. apply environmental ethics in protection of diversified ecosystems.
14	MA301B	Mathematics – III(<i>Common to all branches</i>)	2021	<ol style="list-style-type: none"> 1. Solve field problems in engineering involving PDEs. 2. Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
15	CE302C	Strength of Materials	2021	<ol style="list-style-type: none"> 1) Develop shear force and bending moment diagrams for different load cases. 2) Compute the flexural stresses for different load cases and different cross-sections.
16	HS303C	Managerial Economics and Accountancy (<i>Common to all branches</i>)	2021	<ol style="list-style-type: none"> 1. Understand Macro Economic environment of the business and its impact on enterprise. 2. Identify various cost elements of the product and its effect on decision making. 3. Understand the concepts of financial management and smart investment. 4. Prepare the Accounting records and interpret the data for Managerial Decisions.
17	CE304C	Surveying	2021	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Identify data collection methods and prepare field notes. <input type="checkbox"/> <input type="checkbox"/> Measure and layout elevations and relative position of points, understand plans and field notes. <input type="checkbox"/> <input type="checkbox"/> Ability to design, set out curves and use modern equipment. <input type="checkbox"/> <input type="checkbox"/> Calculate angles, distances, levels, estimate measurement errors and apply corrections. <input type="checkbox"/> <input type="checkbox"/> Interpret survey data and compute areas and volumes.
18	CE305C	Building Materials and	2021	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Explain the manufacturing, physical and mechanical properties of various

		Construction Technology		<p>construction materials and their testing procedures.</p> <p><input type="checkbox"/> <input type="checkbox"/> Describe the basic building components.</p> <p><input type="checkbox"/> <input type="checkbox"/> Apply the methods to be followed in constructing various components of a building.</p>
19	CE306C	Engineering Geology	2021	<ol style="list-style-type: none"> 1. To apply the geological knowledge to Civil Engineering Constructions, at different stages. The kind of study exposes the geological draw backs, if any. 2. To help the site engineers to take suitable precautionary measures to overcome the drawbacks but also to take advantage of the site geology findings wherever possible. 3. To take precautionary measures in civil engineering constructions based on geological parameters.
20	CE 307P	Surveying Lab	2021	<ol style="list-style-type: none"> 1. Ability to use the techniques, skill and surveying equipment for engineering practice. 2. Ability to apply mathematics concepts in the field of surveying. 3. Ability to develop an understanding of modern surveying equipment
21	CE 308P	Materials Testing Lab	2021	<ol style="list-style-type: none"> 1. Determine the properties of different building construction materials. 2. Analyse the behaviour of different construction materials.
22	CE309S	Computer Skills	2021	<ol style="list-style-type: none"> 1. Use MS WORD, MS EXCEL AND POWER POINT in any civil engineering project works and for personal works.
23	MC310A	Constitution of India(<i>Common to all branches</i>)	2021	<ol style="list-style-type: none"> 1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. Discuss the passage of the Hindu Code Bill of 1956.
24	MA401C	Probability & Statistics (<i>Common to all branches</i>)	2021	<ul style="list-style-type: none"> • evaluate approximating the roots of polynomial and transcendental equations by different algorithms • Apply different algorithms for approximating the solutions of ordinary

				<p>differential equations to its analytical computations</p> <ul style="list-style-type: none"> ● apply discrete and continuous probability distributions ● design the components of a classical hypothesis test <p>infer the statistical inferential methods based on small and large sampling tests</p>
25	CE402C	Concrete Technology and Construction Equipment	2021	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Understand various ingredients of concrete and their role. <input type="checkbox"/> <input type="checkbox"/> Examine knowledge on the fresh and hardened properties of concrete. <input type="checkbox"/> <input type="checkbox"/> Design concrete mixes using various methods. <input type="checkbox"/> <input type="checkbox"/> Perceive special concretes for accomplishing performance levels.
26	CE403C	Fluid Mechanics and Hydraulic Machines	2021	<ol style="list-style-type: none"> 1. Able to solve fluid flow problems using fundamental principles 2. Able to apply the knowledge of fluid flow concepts and fundamental equations for solving problems 3. Able to measure pressure, velocity and discharge, and apply the knowledge of impacts of jets related to real life problems. 4. Able to analyze the flow problems in laminar and turbulent flow conditions. 5. Able to analyze the characteristics of turbines and pumps.
27	CE404C	Structural Analysis	2021	<ul style="list-style-type: none"> ● Understand various engineering properties of materials ● Estimate magnitudes under combined loads in members and structures ● Determine shear stresses for different cross-sections. ● Determine deflection at any point on a beam under simple or combined loads ● Apply failure criteria to implement in design of structural members. ● Analyze members under torsion, combined torsion and bending moment for determination of energy absorption
28	CE405C	Environmental Engineering -1	2021	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Able to estimate the water demand of any area and understand the water sources and its quality <input type="checkbox"/> <input type="checkbox"/> Able to solve the distribution network problems <input type="checkbox"/> <input type="checkbox"/> Able to explain the water quality parameters <input type="checkbox"/> <input type="checkbox"/> Able to plan and design water treatment plant <input type="checkbox"/> <input type="checkbox"/> Able to understand advanced water treatment technologies
29	CE406C	Soil Mechanics	2021	<ul style="list-style-type: none"> ● Identify and classify various soils based on their characteristics. ● Compute effective stress under different conditions ● Evaluate permeability and seepage of soils. ● Understand consolidation in soils and Calculate consolidation time and settlement of soils.

				<ul style="list-style-type: none"> ● Understand shear strength theories and Determine Shear Characteristics of soils
30	CE407P	Fluid Mechanics and Hydraulic Machines Lab	2021	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Able to calibrate the flow measuring devices. <input type="checkbox"/> <input type="checkbox"/> Able to calculate loss coefficients for use in the pipe flow analysis. <input type="checkbox"/> <input type="checkbox"/> Able to prepare the characteristic curves of the pumps.
31	CE408P	Soil Mechanics Lab	2021	<ol style="list-style-type: none"> 1. Depict the procedures for measuring the engineering properties of soils. 2. Describe the procedure for measuring the basic properties and compaction characteristics of soils. 3. Assess the soil for engineering applications
32	CE409S	Python Programming	2021	<ol style="list-style-type: none"> 1. Apply the OOP principles and best practices of python programming. 2. Write clear and effective pythonic code. 3. Create applications using python programming. 4. Implementing databases using SQLite and Access databases using python programming. 5. Understand and feel comfortable in working with web application frameworks. 6. Develop APIs required for the web applications using web frameworks like Flask and Fast AP
33	CE410P	Computer Aided Building Drawing	2021	<ul style="list-style-type: none"> ● Develop drawing skills for effective demonstration of building details. ● Draw building plans using Computer Aided Design and Drafting soft wares. ● Develop engineering project drawings incorporating details and design parameters in 2D. ● Examine efficacy of AUTOCAD design and Drawing.

Civil Engineering SE M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SEPC01	Advanced Structural Analysis	2021	<ol style="list-style-type: none"> 1. Analysis the structures due to the effects of settlements and temperature changes. 2. Analyze the skeleton structures using stiffness analysis code. 3. Use direct stiffness method understanding its limitations 4. Study the fundamentals of FEM
2	SEPC02	Advanced Solid Mechanics	2021	<ol style="list-style-type: none"> 1. Solve simple problems of elasticity and plasticity understanding the basic concepts.

				<ol style="list-style-type: none"> 2. Apply numerical methods to solve continuum problems. 3. Study the two-dimensional problems of Elasticity. 4. Solving the tensional problem of prismatic beam. 5. Solve the problems of plasticity understanding the basic concepts.
3	SEPE11	Theory of Thin Plates and Shells	2021	<ol style="list-style-type: none"> 1. Use analytical methods for the solution of thin plates and shells. 2. Use analytical methods for the solution of shells. 3. Apply the numerical techniques and tools for the complex problems in thin plates. 4. Apply the numerical techniques and tools for the complex problems in shells.
4	SEPE22	Structural Health Monitoring	2021	<ol style="list-style-type: none"> 1. Diagnose the distress in the structure understanding the causes and factors. 2. Assess the health of structure using static field methods. 3. Assess the health of structure using dynamic field tests. 4. Suggest repairs and rehabilitation measures of the structure.
5	SECP01	Structural Design Lab	2021	<ol style="list-style-type: none"> 1. Design and Detail all the Structural Components of Frame Buildings. 2. Design and Detail complete Multi-Storey Frame Buildings.
6	SECP02	Advanced Solid Mechanics Lab	2021	<ol style="list-style-type: none"> 1. Design high grade concrete and study the parameters affecting its performance. 2. Conduct Non Destructive Tests on existing concrete structures. 3. Apply engineering principles to understand behavior of structural/elements.
7	PGPA12	Disaster Management	2021	<ol style="list-style-type: none"> 1. demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. 2. critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. 3. develop the standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.
8	PGPC41	Research Methodology and IPR	2021	<ol style="list-style-type: none"> 1. Understand research problem formulation. 2. Analyze research related information

				<p>3. Follow research ethics</p> <p>4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</p> <p>5. Understand that when IPR would take such important place in growth of individuals & Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.</p> <p>6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.</p>
9	SEPC03	FEM in Structural Engineering	2021	<p>1. Use Finite Element Method for structural analysis.</p> <p>2. Execute the Finite Element Program/ Software.</p> <p>3. Solve continuum problems using finite element analysis.</p> <p>4. Develop the FEM software.</p>
10	SEPC04	Structural Dynamics	2021	<p>1. Analyze and study dynamics response of single degree freedom system using fundamental theory and equation of motion.</p> <p>2. Analyze and study dynamics response of Multi degree freedom system with lumped parameter using fundamental theory and equation of motion.</p> <p>3. Analyze and study dynamics response of Multi degree freedom system with distributed man and load.</p> <p>4. Study the concepts of dynamic effects due to wind loading, moving loading & vibrations caused by Traffic, Blasting & Pile driving.</p> <p>5. Use the available software for dynamic analysis.</p>
11	SEPE33	Design of High Rise Structures	2021	<p>1. Analyse, design and detail Transmission/ TV tower, Mast and Trestles with different loading conditions.</p> <p>2. Analyse, design and detail the RC and Steel Chimney.</p> <p>3. Analyse. design and detail the tall buildings subjected to different loading conditions using relevant codes.</p> <p>4. Analysis and design of dynamic approach OF STRUCTURAL DESIGN</p>

				USING is Code provisions.
12	SEPE41	Design of Advanced Concrete Structures	2021	<ol style="list-style-type: none"> 1. Model the loads and findings the material properties. 2. Design deep beams and corbels 3. Design of shear walls using IS, ACI & Errocode. 4. Analyse the special structures by understanding their behaviour in torsional buckling. 5. Design and prepare detail structural drawings for execution citing relevant IS codes.
13	SECP03	Core Lab III Model Testing Lab	2021	<ol style="list-style-type: none"> 1. Plan the test set-up for model testing 2. Understand the behavior of structural components.
14	SECP04	Core Lab IV Numerical Analysis Lab	2021	<ol style="list-style-type: none"> 1 Find Roots of non-linear equations by Bisection method and Newton's method. 2 Do curve fitting by least square approximations by using matlab 3 Solve the system of Linear Equations using Gauss - Elimination/ Gauss - Seidal Iteration/ Gauss - Jorden Method 4 To Integrate Numerically Using Trapezoidal and Simpson's Rules 5 To Find Numerical Solution of Ordinary Differential Equations by Euler's Method, Runge- Kutta Method
15	SEPE51	Design of Pre-stressed Concrete Structures	2021	<ol style="list-style-type: none"> 1. Find out losses in the pre-stressed concrete. Understand the basic aspects of pre-stressed concrete fundamentals, including pre and post-tensioning processes. 2. Analyse pre-stressed concrete deck slab and beam/ girders. 3. Design pre-stressed concrete deck slab and beam/ girders. 4. Design of end blocks for pre-stressed members.
16	SEOE12	Industrial Safety	2021	<ol style="list-style-type: none"> 1. To list out important legislations related to health, Safety and Environment. 2. To list out requirements mentioned in factories act for the prevention of accidents. 3. To understand the health and welfare provisions given in factories act.

Civil Engineering M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1	GTPC01	Advanced Soil Mechanics	2021	<ol style="list-style-type: none"> 1. The students obtain the complete knowledge on Strength and Compressibility of soil mass of soil mass. 2. To learn importance of stress paths on strength Characteristics. 3. The students are able to develop mathematical models for solving different problems in soil mechanics using critical state frame work.
2	GTPC02	Advanced Foundation Engineering	2021	<ol style="list-style-type: none"> 1. The students will be able to analyse and proportion shallow foundation. 2. To learn load transfer mechanisms and proportioning of deep foundations. 3. To comprehend design aspects of foundations in problematic soils 4. The students will be able to assess the type of foundations to be recommended for construction design of coffer dams.
3	GTPE11	Soil Structure Interaction	2021	<ol style="list-style-type: none"> 1. The student is exposed to soil foundation interaction behavior 2. The student learns analysis of structures using soils modeling soil as elastic half space and discrete springs. 3. The student will be able to analyse settlements and load distributions in piles and pile groups subjected to vertical and lateral loads.
4	GTPE12	Ground Improvement Techniques	2021	<ol style="list-style-type: none"> 1. Assess the site or ground conditions and judge for adopting ground improvement techniques for a particular structure and site conditions. 2. Select suitable compaction techniques or stabilization methods for improving engineering properties of soils in shallow layers. 3. To modify ground conditions by freezing and thermal methods. 4. Select suitable reinforced earth methods for stabilizing soils in retaining walls and slopes.
5	GTPE13	Pavement Analysis and Design	2021	<ol style="list-style-type: none"> 1. Assess the factors affecting the performance of pavements. 2. Identifying failure criteria and design flexible and rigid pavements. 3. Compare and select suitable pavement design approaches, overlays, and design aspects.
6	GTPE22	Environmental Geotechnology	2021	<ol style="list-style-type: none"> 1. Students can understand Soil-environment interaction, Soil mineralogy and 2. Mechanisms of soil-water interaction

				<p>3. Students can lean ground water flow and predict contaminant transport phenomenon.</p> <p>4. Can apply remediation techniques for contaminated site.</p>
7	GTPE23	Critical State Soil Mechanics	2021	<p>1. Acquire fundamentals concept of Stresses and Strains and their states in soils.</p> <p>2. Comprehend the critical state line and the Roscoe surface.</p> <p>3. Gain knowledge on Cam-Clay model for analyzing the the plastic behaviour of soils before failure.</p> <p>4. Familiarize with the Development of constitutive laws for geotechnical materials including linear or nonlinear elastic (hyperbolic), linear elastic perfectly plastic, and nonlinear elastic-plastic models based on the Critical State Soil Mechanics theory.</p>
8	GTCP01	Geotechnical Engineering Lab - 1	2021	<p>1. Determine all Index Properties for Cohesive and Cohsionless Soils</p> <p>2. Determine Density Index for Cohesionless Soils.</p> <p>3. Determine Compaction Characteristics for Cohesive Soils</p> <p>4. Determine Permeability Characteristics for Cohesive and Cohesionless Soils.</p>
9	GTCP02	Geotechnical Engineering Lab - 2	2021	<p>1. Determine Unconfined Compressive Stress for Cohesive Soils.</p> <p>2. Determine shear parameter for Cohesionless Soils.</p> <p>3. Determine Swelling Characteristics by different methods.</p>
10	PGPC41	Research Methodology and IPR	2021	<p>1. Understand research problem formulation.</p> <p>2. Analyze research related information</p> <p>3. Follow research ethics</p> <p>4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</p> <p>5. Understanding that when IPR would take such important place in growth of individuals & Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn</p>

				brings about, economic growth and social benefits.
11	GTPC03	Dynamics of soils and foundations	2021	<ol style="list-style-type: none"> 1. Students understands theory of vibration and resonance phenomenon, dynamic amplification 2. Students understand propagation of body waves and surface waves through soil. 3. Student exposed to different methods for estimation of dynamic soil properties required for design purpose. 4. Students apply theory of vibrations to design machine foundation based on dynamic soil properties and bearing capacity. 5. Students can predict dynamic bearing capacity and methods of vibration isolation.
12	GTPC04	Subsurface investigations and instrumentation	2021	<ol style="list-style-type: none"> 1. Students can plan subsurface investigation based on the requirement of civil engineering project and site condition. Can finalize depth and number of boreholes 2. Students can execute different subsurface exploration tests, collect Disturbed / undisturbed samples for laboratory tests and can suggest design parameters. 3. Student exposed to different methods for estimation of soil properties required for design purpose. 4. Students can develop instrumentation scheme for monitoring of critical sites
13	GTPE31	Offshore Geotechnical Engineering / Marine Geotechniques	2021	<ol style="list-style-type: none"> 1. Physical and Engineering properties of marine soils and problems specific to marine soil deposits. 2. Behavior of sands and clays under cyclic loading 3. Site investigation in marine environment including Geophysical methods. 4. Assess the factors governing the choice of the most suitable type of foundation for a given marine Structure. 5. Select the type of foundation for a given marine Structure.
14	GTPE32	Computational Geomechanics	2021	<ol style="list-style-type: none"> 1. Solution of linear equations 2. Finite difference form of ordinary and partial differential equations

				<p>3. Difference between correlation and regression analysis.</p> <p>4. Apply finite difference technique to solve complex consolidation and seepage problems in Geotechnical Engineering.</p>
15	GTPE33	3. Engineering rock mechanics	2021	<p>1. Assess the Physical and Mechanical properties of rocks.</p> <p>2. Adopt direct & indirect methods of rock exploration.</p> <p>3. Conduct different laboratory tests on rocks and analyse the results for rock properties</p> <p>4. Stress Strain behavior under Compressive, tension and Shear</p> <p>5. Strength criteria functions applied to Rocks.</p>
16	GTPE41	Earth Retaining Structures	2021	<p>1. Develop an understanding of the fundamental concepts that governs the behaviour of Earth and Earth Retaining Structures.</p> <p>2. Analyze and Design Retaining Walls,</p> <p>3. Analyze and Design Braced Cuts,</p> <p>4. Analyze and Design Shafts, Tunnels and Underground Conduits.</p>
17	GTPE42	Design of underground excavations	2021	<p>1. Students can plan exploration for various underground projects.</p> <p>2. Students can understand the use of elastic and plastic analysis in the design of underground support system.</p> <p>3. Students can classify rock masses and select suitable method for advising tunnels.</p> <p>4. Design of various tunnel support system.</p> <p>5. Students will have idea about the field tests generally conducted during and after construction of under structures.</p>
18	GTPE43	Physical and Constitutive Modelling in Geomechanics	2021	<p>1. Stress strain models of elasticity of isotropic and anisotropic models.</p> <p>2. Students can understand theory of plasticity and various yield criteria and flow rule.</p> <p>3. Students can apply critical state concept to consolidation and triaxial soil behavior.</p> <p>4. Students can understand the application aspects of elastic plastic models.</p>
19	GTCP03	Sub soil exploration	2021	<p>1. Evaluate vertical and lateral extent of exploration; identify, select, and plan different stages of subsurface exploration for various civil engineering projects.</p> <p>2. Discriminate, Classify and analyses different techniques of exploration to be adopted in</p>

				<p>rocks and soils.</p> <p>3. Discriminate different types of soil samples, samplers and judge the appropriateness of a sample or sampler for practical cases accounting for the safety and economy.</p> <p>4. Evaluate different in-situ methods of tests to determine engineering properties of soils and locate Ground water table required for safe and economic design of foundations.</p> <p>5. Methods of planning, executing, implementing, interpreting, and reporting subsoil investigations based on geophysical methods.</p>
20	GTCP04	Numerical Analysis Lab	2021	<p>1. Develop and Analysis of laboratory tests results using Spread sheets</p> <p>2. Develop and analysis of Spread sheets for stress distribution for different loading conditions.</p> <p>3. Determine Bearing Capacity of given soil sample.</p> <p>4. Able to determine settlements</p>
21	GTPE51	Stability analysis of slopes	2021	<p>1. Identifying types and causes of slope failures.</p> <p>2. Student will be able to check the stability of earthen dams</p> <p>3. The safety measures to be undertaken to prevent the instability of slopes, earthen dams and embankments.</p> <p>4. Understand maintenance and monitoring of slopes.</p>
22	GTPE52	Foundations on weak rocks	2021	<p>1. Understand Rock mass classification and its Engineering properties.</p> <p>2. Determine engineering properties of in-situ rocks and modes of failure associated.</p> <p>3. Assess allowable Bearing pressure.</p> <p>4. Design different types of foundations planned over rock mass.</p>
23	GTPE53	Geotechnical earthquake engineering	2021	<p>1. Students will know the causes and quantification of earthquake.</p> <p>2. Student will be exposed to the effect of earthquake and ground motion.</p> <p>3. Student will be able to understand Ground response analysis and Liquefaction effects.</p> <p>4. Student will be able to understand the seismic design of foundation</p>
24	GTOE11	Business Analytics	2021	<p>1. Students will demonstrate knowledge of data analytics.</p> <p>2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.</p>

				<p>3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.</p> <p>4. Students will demonstrate the ability to translate data into clear, actionable insights.</p>
25	GTOE12	Industrial Safety	2021	<p>1. Students will demonstrate knowledge of data analytics.</p> <p>2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.</p> <p>3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.</p> <p>4. Students will demonstrate the ability to translate data into clear, actionable insights.</p>
26	GTOE13	Operations Research	2021	<p>1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis</p> <p>4. Student should able to model the real world problem and simulate it.</p>
27	GTOE14	Cost Management of Engineering Projects	2021	<p>1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis</p> <p>4. Student should able to model the real world problem and simulate it.</p>
28	GTOE15	Composite Materials	2021	<p>1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis Student should able to model the real world problem and simulate it</p>
29	GTOE16	Energy Generation from Waste	2021	<p>1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis Student should</p>

				able to model the real world problem and simulate it.
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Computer Science & Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA301C	Mathematics III	2021	<p>Understand the analyticity of complex functions and conformal mappings.</p> <p>Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.</p> <p>Describe basic properties of complex integration and having the ability to compute such integrals.</p> <p>Describe conformal mappings between various plane regions.</p>
2	CS302C	Database Management Systems	2021	<ul style="list-style-type: none"> □ Use relational algebra and relational calculus, to express database queries. □ Use SQL to interact with database management systems. □ Design appropriate database tables, using functional dependencies and normal forms. □ Implement a disk-oriented database storage manager with heap table and indexes. □ Understand, compare, and implement the major concurrency control algorithms. □ Implement database recovery algorithms and verify their correctness. □ Identify trade-offs among database systems techniques and contrast distributed/parallel alternatives for both on-line transaction processing and on-line analytical workloads.
3	CS303C	Discrete Mathematical Structures	2021	<ul style="list-style-type: none"> □ Verify the correctness of an argument using propositional and predicate logic □ Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction. □ Solve problems involving recurrence relations and generating functions.

				<ul style="list-style-type: none"> □ Construct and analyze graph models for problems in different areas. □ Design and develop real time application using graph theory
4	CS304C	Basic Electrical Engineering	2021	<ul style="list-style-type: none"> □ understand and analyze basic electric and magnetic circuits. □ study the working principles of electrical machines and power converters. □ introduce the components of low-voltage electrical installations.
5	CS309S	Skill Oriented Course - Basic Python Programming	2021	<ul style="list-style-type: none"> □ understand the structure, syntax, and semantics of the Python language. □ interpret the concepts of Object-Oriented Programming as used in Python. □ demonstrate proficiency in handling Strings and File Systems. □ implement desktop/Web-based applications using the Python programming language.
6	PA310A	Audit Course - Constitution of India	2021	<ul style="list-style-type: none"> □ the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. □ the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. □ the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. □ the passage of the Hindu Code Bill of 1956.
7	CS401C	Digital Electronics and Logic Design	2021	<ul style="list-style-type: none"> □ Design and analyze combinational logic circuits □ Design and analyze synchronous sequential logic circuits □ Design and implement complicated digital systems using Verilog □ Design a VLSI circuit for an application
8	CS402C	Simulation and Modeling	2021	<ul style="list-style-type: none"> □ describe the components of continuous and discrete systems and simulate the same. □ model any system from different fields. <ul style="list-style-type: none"> □ discuss the simulation methods and select the suitable technique on the problems. □ implement the model on the computer and from the results, check for the validity of the model and correctness of the assumptions present in the model. □ understand the limitations of their model and nuances in

				computer modeling of systems
9	HS403C	Managerial Economics and Accountancy	2021	<ul style="list-style-type: none"> ☐ Understand Macro Economic environment of the business and its impact on enterprise. ☐ Identify various cost elements of the product and its effect on decision making. ☐ Understand the concepts of financial management and smart investment. ☐ Prepare the Accounting records and interpret the data for Managerial Decisions
10	CS405C	Computer Organization	2021	<ul style="list-style-type: none"> ☐ Identify the basic structure and functional units of a digital computer. ☐ Analyze the effect of addressing modes on the execution time of a program. ☐ Design processing unit using the concepts of hardwired control or microprogrammed control. ☐ Select appropriate interfacing standards for I/O devices. ☐ Identify the roles of various functional units of a computer in instruction execution. ☐ Understand memory hierarchy and its impact on computer cost/performance. ☐ Understand the advantage of instruction level parallelism and pipelining for high performance processor design
11	CS406C	Design and Analysis of Algorithms	2021	<ul style="list-style-type: none"> ☐ Develop systematically an algorithm for solving a problem ☐ Analyze the time and space complexity of the given algorithm ☐ Identify algorithm design methodology to solve problems. ☐ Distinguish between P and NP classes of problems
12	CS409S	Skill Oriented Course - Basic Web Designing	2021	<ul style="list-style-type: none"> ☐ describe and explain the relationship among HTML, XHTML, CSS, JavaScript, XML and other web technologies. ☐ create and publish advanced web pages with the help of HTML frames, scripting languages, and CSS. ☐ design forms for thick clients using JavaScript with interactive responsiveness and validations. ☐ design, host and publish websites in various domains
13	CSHN01	Distributed Databases	2021	<ul style="list-style-type: none"> ☐ Design and implement distributed databases. ☐ Handle query processing in a distributed database system. ☐ Comprehend transaction management and analyze various

				<p>approaches to concurrency control in distributed databases.</p> <ul style="list-style-type: none"> □ Design and implement various algorithms and techniques for deadlock and recovery in distributed databases
14	CSMN01	Data Structures	2021	<ul style="list-style-type: none"> □ Choose appropriate data structure for the specified problem definition. □ Implement linear and non-linear data structures viz. stacks, queues, linked list, trees, graphs. □ Apply the concept of trees and graph data structures for the real world problems. □ Comprehend the implementation of sorting and searching algorithms

Electrical and Electronics Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA301B	MATHEMATICS –III	2021	<ol style="list-style-type: none"> 1. Acquire the knowledge of functions of complex variables. 2. understand power series and expansion of analytic function. 3. understand Laurent Series, poles, singular points, Residue theorem and its applications. 4. analyze the solutions of partial differential equations. 5. discuss the boundary value problems, one dimensional wave equation, heat equation and Laplace Equation.
2	EE302C	ELECTRO MAGNETIC FIELDS	2021	<ol style="list-style-type: none"> 1. get acquainted with different coordinate systems and their transformation. 2. learn different concepts in Electrostatic fields. 3. learn different concepts in magnetic fields 4. get acquainted with time varying electric and magnetic fields.
3	EE303C	NETWORK ANALYSIS	2021	<ol style="list-style-type: none"> 1. Apply Network theorems for the analysis of electrical circuits. 2. Analyze the time domain behavior of electrical circuits under transient conditions. 3. Evaluate the network functions and two-port network parameters. 4. Synthesize the one port networks using Foster and Cauer methods.
4	EE304C	D.C. MACHINES AND	2021	<ol style="list-style-type: none"> 1. Understand the concepts of energy conversion principles,

		TRANSFORMERS		<p>constructional details and principle of operation of DC machines and Transformers.</p> <p>2. Analyze the performance of the DC Machines under various operating conditions using their various characteristics and testing methods.</p> <p>3. Analyze the parallel operation of DC machines and transformers and select appropriate machine as per applications.</p> <p>4. Evaluate the performance of Transformers using phasor diagrams, connections, testing methods and equivalent circuits.</p>
5	EE305C	ANALOG ELECTRONICS	2021	<p>1. understand the characteristics of various components.</p> <p>2. Understand the biasing techniques</p> <p>3. Design and analyze various rectifiers, small signal amplifier circuits.</p> <p>4. Design sinusoidal and non-sinusoidal oscillators.</p> <p>5. Understand the functioning of OP-AMP and design OP-AMP based circuits.</p>
6	EE306L	ELECTRICAL CIRCUITS AND NETWORKS LAB	2021	<p>1. Verify Network theorems for the analysis of electrical circuits.</p> <p>2. Analyze the time domain behavior of electrical circuits under transient conditions.</p> <p>3. Draw the locus diagrams and analyse the resonance conditions.</p> <p>4. Evaluate the two-port network parameters.</p>
7	EE307L	D.C. MACHINES AND TRANSFORMERS LAB	2021	<p>1. Test the performance of any DC machines and single-phase transformers, by conducting suitable experiments and report the results.</p> <p>2. Analyze the various speed control methods of DC motors and characteristics of DC machines.</p> <p>3. Understand the significance of different connections of three-phase transformers.</p>
8	EE309S	COMPUTER SKILLS	2021	<p>1. Identify basic terms, concepts, and functions of computer system components.</p> <p>2. Select and use the appropriate software application to complete a particular task such as a word Processing skill to create, save, modify business documents.</p>

				<p>3. Identify basic concepts and procedures for creating, viewing, and managing files, and folders for different operating systems.</p> <p>4. Identify basic concepts of organization and procedures for creating, and viewing will software presentation such as PowerPoint.</p>
9	MC310A	CONSTITUTION OF INDIA	2021	<p>1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.</p> <p>2. address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.</p> <p>3. address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.</p>
10	EE401C	POWER SYSTEMS-I	2021	<p>1. Understand the power system structure and principles of energy generation from conventional and renewable energy sources</p> <p>2. Analyze the economic aspects of power generation.</p> <p>3. Acquire the knowledge on parameter calculations and mechanical design in transmission lines.</p>
11	EE402C	INDUCTION MOTORS AND SYNCHRONOUS MACHINES	2021	<p>1. Understand the constructional details and principle of operation of Induction and Synchronous Machines.</p> <p>2. Understand parallel operation, speed control and starting of AC machines.</p> <p>3. Analyze the performance of the Induction and Synchronous Machines using the phasor diagrams, equivalent circuits and by testing.</p> <p>4. Select appropriate AC machine for any application and appraise its significance</p>
12	EO403C	MANAGERIAL ECONOMICS AND	2021	<p>1. Understand Macro Economic environment of the business and its impact on enterprise.</p>

		ACCOUNTANCY		<p>2. Identify various cost elements of the product and its effect on decision making.</p> <p>3. Understand the concepts of financial management and smart investment.</p> <p>4. Prepare the Accounting records and interpret the data for Managerial Decisions.</p>
13	EE404C	DIGITAL ELECTRONICS	2021	<p>1. Understand working of logic families and logic gates.</p> <p>2. Design and implement Combinational and Sequential logic circuits.</p> <p>3. Understand the process of Analog to Digital conversion and Digital to Analog conversion.</p> <p>4. Be able to use PLDs to implement the given logical problem.</p>
14	EE405C	SIGNALS AND SYSTEMS	2021	<p>1. Differentiate between various types of signals and understand the implication of operations of signals</p> <p>2. Understand and classify systems based on the impulse response behaviour of both continuous-time and discrete-time systems</p> <p>3. Perform domain transformation from time to frequency and understand the energy distribution as a function of frequency</p> <p>4. Usefulness of convolution for analysing the LTI systems and understand the concepts of power spectral density through correlation.</p> <p>5. Solve differential and difference equations with initial conditions using Laplace and Z- transforms.</p>
15	EE406L	INDUCTION MOTORS AND SYNCHRONOUS MACHINES LAB	2021	<p>1. Test the performance of induction motors and synchronous machines by conducting suitable experiments and report the results.</p> <p>2. Analyze the speed control methods of three-phase induction motors by conducting suitable experiments.</p> <p>3. Understand the parallel operation and estimate the regulation of alternators.</p>
16	EE407L	ANALOG AND DIGITAL	2021	<p>1. Plot the characteristics of Electronic Devices to understand the behavior</p>

		ELECTRONICS LAB		<ul style="list-style-type: none"> 2. Design, construct and test amplifier circuits and interpret results 3. Design and analyze combinational logic circuits 4. Design and analyze flip flops and Sequential logic circuits
17	EE409S	PYTHON PROGRAMMING	2021	<ul style="list-style-type: none"> 1. Implement python programming constructs to build small to large applications. 2. Implement the problems in terms of real-world objects. 3. Evaluate and handle the errors during runtime involved in a program. 4. Extract and import packages for developing different solutions for real time problems
18	EEHN01	ELECTRICAL MACHINE DESIGN	2021	<ul style="list-style-type: none"> 1. Understand the construction and performance characteristics of electrical machines. 2. Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machines 3. Understand the principles of electrical machine design and carry out a basic design of an ac machine. 4. Use software tools to do design calculations.
19	EEMN01	ELECTRICAL CIRCUITS AND NETWORKS	2021	<ul style="list-style-type: none"> 1. Understand and apply the basic circuit concepts to analyse D.C and A.C. Circuits. 2. Apply Network theorems for the analysis of electrical circuits. 3. Understand the resonance circuit concept. 4. Evaluate the two-port network parameters.
20	EEMN02	ELECTRICAL MACHINES	2021	<ul style="list-style-type: none"> 1. Understand the concepts of energy conversion principles, constructional details and principle of operation of DC and AC machines. 2. Analyze the performance of the DC and AC Machines under various operating conditions using their various characteristics and testing methods. 3. Understand parallel operation, speed control and starting of DC and AC machines. 4. Select appropriate machine for any application and appraise its significance.

Electrical and Electronics Engineering M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	PSPC 01	POWER SYSTEM ANALYSIS	2021	<ol style="list-style-type: none"> 1. Find the bus admittance and bus impedance matrices of the given power system network 2. Calculate fault currents in each phase 3. Calculate voltage phasors at all buses for the given data using various methods of load flow 4. Rank various contingencies according to their severity 5. Estimate closeness to voltage collapse and calculate PV curves using continuation power flow
2	PSPC 02	ELECTRIC POWER DISTRIBUTION SYSTEM	2021	<ol style="list-style-type: none"> 1. Knowledge of power distribution system 2. Study of Distribution automation and its application in practice 3. To learn SCADA system
3	PSPE 11	RENEWABLE ENERGY SOURCES	2021	<ol style="list-style-type: none"> 1. Gain knowledge on renewable sources like solar, biomass, wind energies 2. Realize solar energy applications using photo voltaic cells 3. Analyze biogas performance and testing and Hybrid Energy Systems
4	PSPE 12	SMART GRIDS	2021	<ol style="list-style-type: none"> 1. Appreciate the difference between smart grid & conventional grid 2. Apply smart metering concepts to industrial and commercial installations 3. Formulate solutions in the areas of smart substations, distributed generation and wide area measurements 4. Come up with smart grid solutions using modern communication technologies
5	PSPE 13	HIGH POWER CONVERTERS	2021	<ol style="list-style-type: none"> 1. Learn the characteristics of GTOs, IGBTs and use them in practical systems 2. Knowledge of working of multi-level VSIs, DC-DC switched mode converters, cyclo-converters

				<p>and PWM techniques and the ability to use them properly</p> <ol style="list-style-type: none"> 3. Acquire knowledge of power conditioners and their applications 4. Ability to design power circuit and protection circuit of PSDs and converters
6	PSPE 14	WIND AND SOLAR SYSTEMS	2021	<ol style="list-style-type: none"> 1. Appreciate the importance of energy growth of the power generation from the renewable energy sources and participate in solving these problems 2. Demonstrate the knowledge of the physics of wind power and solar power generation and all associated issues so as to solve practical problems 3. Identify, formulate and solve the problems of energy crises using wind and solar energy
7	PSPE 15	ENERGY AUDITING AND MANAGEMENT	2021	<ol style="list-style-type: none"> 1. Acquire the background required for engineers to meet the role of energy managers and to acquire the skills and techniques required to implement energy management 2. Identify and quantify the energy intensive business activities in an organization 3. Able to perform Basic Energy Audit in an Organization
8	PSPE 21	POWER SYSTEM DYNAMICS-I	2021	<ol style="list-style-type: none"> 1. Understand the modeling of synchronous machine in details 2. Carry out simulation studies of power system dynamics using MATLAB-SIMULINK, MI POWER 3. Carry out stability analysis with and without power system stabilizer (PSS)
9	PSPE 22	MATHEMATICAL METHODS FOR POWER ENGINEERING	2021	<ol style="list-style-type: none"> 1. Knowledge about vector spaces, linear transformation, Eigen values and eigenvectors of linear operators 2. To learn about linear programming problems and understanding the simplex method for solving linear programming problems in various fields of science and technology 3. Acquire knowledge about nonlinear programming and various techniques used for solving constrained and unconstrained nonlinear programming problems 4. Understanding the concept of random variables, functions of random variable and their probability distribution 5. Understand stochastic processes and their classification

10	PSPE 23	PULSE WIDTH MODULATION FOR PE CONVERTERS	2021	<ol style="list-style-type: none"> 1. Learn different types of PWM schemes and their applications 2. Asses the THD for different types of PWM schemes 3. Choose suitable PWM scheme for different topologies of power electronic circuits
11	PSPE 24	ELECTRIC AND HYBRID VEHICLES	2021	<ol style="list-style-type: none"> 1. Acquire knowledge about fundamental concepts, principles, analysis and design of hybrid and electric vehicles. 2. To learn electric drive in vehicles and traction
12	PSPE 25	REACTIVE POWER CONTROL AND MANAGEMENT	2021	<ol style="list-style-type: none"> 1. Understand the significance of reactive power control in power system and principles of various controllers. 2. To know about the importance of reactive power management and various management techniques employed in power system networks
13	PGPC 01	RESEARCH METHODOLOGY AND IPR	2021	<ol style="list-style-type: none"> 1. Understand research problem formulation. 2. analyze research related information 3. follow research ethics 4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5. Understand that when IPR would take such important place in growth of individuals & nation, it <p>is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.</p> <ol style="list-style-type: none"> 6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
14	PGPA 11	ENGLISH RESEARCH WRITING FOR PAPER	2021	<ol style="list-style-type: none"> 1. understand how to improve writing skills and level of readability 2. learn about what to write in each section 3. understand the skills needed when writing a Title
15	PGPA 12	DISASTER MANAGEMENT	2021	<ol style="list-style-type: none"> 1. Demonstrate a critical understanding of key concepts in disaster

				<p>risk reduction and humanitarian response.</p> <ol style="list-style-type: none"> 2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. 3. Develop the standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in
16	PGPA 13	SANSKRIT FOR TECHNICAL KNOWLEDGE	2021	<ol style="list-style-type: none"> 1. understand basic Sanskrit language 2. understand the Ancient Sanskrit literature about science & technology 3. help to develop logic, being a logical language
17	PGPA 14	VALUE EDUCATION	2021	<ol style="list-style-type: none"> 1. acquire the knowledge of self-development 2. learn the importance of Human values 3. Develop the overall personality
18	PSPC 03	ADVANCED POWER SYSTEM PROTECTION	2021	<ol style="list-style-type: none"> 1. Learn the importance of static Relays 2. Apply appropriate comparator 3. Learn about digital Protection
19	PSPC 04	POWER QUALITY	2021	<ol style="list-style-type: none"> 1. Acquire knowledge about the harmonics, harmonic introducing devices and effect of harmonics on system equipment and loads 2. To develop analytical modeling skills needed for modeling and analysis of harmonics in networks and components 3. To introduce the student to active power factor correction based on static VAR compensators and its control techniques 4. To introduce the student to series and shunt active power filtering techniques for harmonics
20	PSPE 31	RESTRUCTURED POWER SYSTEMS	2021	<ol style="list-style-type: none"> 1. Describe various types of regulations in power systems. 2. Identify the need of regulation and deregulation. 3. Define and describe the Technical and Non-technical issues in Deregulated Power Industry. 4. Identify and give examples of existing electricity markets.

				5. Classify different market mechanisms and summarize the role of various entities in the market.
21	PSPE 32	ADVANCED DIGITAL SIGNAL PROCESSING	2021	<ol style="list-style-type: none"> 1. Knowledge about the time domain and frequency domain representations as well analysis of discrete time signals and systems 2. Study the design techniques for IIR and FIR filters and their realization structures. 3. Acquire knowledge about the finite word length effects in implementation of digital filters. 4. Knowledge about the various linear signal models and estimation of power spectrum of stationary random signals 5. Design of optimum FIR and IIR filters
22	PSPE 33	DYNAMICS OF ELECTRICAL MACHINES	2021	<ol style="list-style-type: none"> 1. Formulation of electro-dynamic equations of all electric machines and analyze the performance characteristics 2. Knowledge of transformations for the dynamic analysis of machines 3. Knowledge of determination of stability of the machines under small signal and transient conditions 4. Study about synchronous machine
23	PSPE 34	POWER APPARATUS DESIGN	2021	<ol style="list-style-type: none"> 1. To give a systematic approach for design and analysis of all rotating machines under both transient and steady state conditions with the dimensions and material used 2. Ability to design all types of transformers and special machines
24	PSPE 35	OPERATION & CONTROL OF INTERCONNECTED POWER SYSTEMS	2021	<ol style="list-style-type: none"> 1. Acquire knowledge on unit commitment, load frequency control, optimum operation, scheduling and coordination of hydrothermal plants, economic generation and power and energy interchange. 2. Solve unit commitment, load frequency control, hydrothermal and fuel scheduling and economy interchange problems using various solution methods. 3. Select and apply appropriate methods to operate inter connected power systems most economically and at constant frequency by optimum utilization of fuels at different loads.
25	PSPE 41	POWER SYSTEM DYNAMICS-II	2021	<ol style="list-style-type: none"> 1. Gain valuable insights into the phenomena of power system including obscure ones.

				<ol style="list-style-type: none"> 2. Understand the power system stability problem. 3. Analyze the stability problems and implement modern control strategies. 4. Simulate small signal and large signal stability problems.
26	PSPE 42	ADVANCED MICRO-CONTROLLER BASED SYSTEMS	2021	<ol style="list-style-type: none"> 1. To learn how to program a processor in assembly language and develop an advanced processor based system 2. To learn configuring and using different peripherals in a digital system 3. To compile and debug a Program 4. To generate an executable file and use it
27	PSPE 43	SCADA SYSTEM AND APPLICATIONS	2021	<ol style="list-style-type: none"> 1. Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications 2. Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system 3. Knowledge about single unified standard architecture IEC 61850 4. To learn about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server
28	PSPE 44	ARTIFICIAL INTELLIGENCE TECHNIQUES	2021	<ol style="list-style-type: none"> 1. Learn the concepts of biological foundations of artificial neural networks 2. Learn Feedback networks and radial basis function networks and fuzzy logics 3. Identifications of fuzzy and neural network 4. Acquire the knowledge of GA
29	PSPE 45	EMBEDDED SYSTEMS	2021	<ol style="list-style-type: none"> 1. Program embedded system with 8051 as processor. 2. Understand different types of communication through, parallel ports, wireless 3. Understand significance of device drivers and interrupt mechanism 4. Understand features of different types of real time OS.
30	PGPA 21	CONSTITUTION OF INDIA	2021	<ol style="list-style-type: none"> 1. The growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. The intellectual origins of the framework of argument that

				<p>informed the conceptualization of social reforms leading to revolution in India.</p> <p>3. The circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</p> <p>4. The passage of the Hindu Code Bill of 1956</p>
31	PGPA 22	PEDAGOGY STUDIES	2021	<p>1. The pedagogical practices being used by teachers in formal and informal classrooms in developing countries.</p> <p>2. the evidence on the effectiveness of these pedagogical practices</p> <p>3. Learns how teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy</p>
32	PGPA 23	STRESS MANAGEMENT BY YOGA	2021	<p>1. develop healthy mind in a healthy body thus improving social health also</p> <p>2. improve efficiency</p>
33	PGPA 24	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT	2021	<p>1. develop personality and achieve the highest goal in life</p> <p>2. lead the nation and mankind to peace and prosperity</p> <p>3. Help in developing versatile personality.</p>
34	PSPE 51	FACTS AND CUSTOM POWER DEVICES	2021	<p>1. Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation Schemes at Transmission and Distribution level in Power Systems.</p> <p>2. Learn various Static VAR Compensation Schemes like Thyristor/GTO Controlled Reactive Power Systems, PWM_Inverter based Reactive Power Systems and their controls.</p> <p>3. To develop analytical modeling skills needed for modeling and analysis of such Static VAR Systems.</p>
35	PSPE 52	INDUSTRIAL LOAD MODELING AND CONTROL	2021	<p>1. Knowledge about load control techniques in industries and its application</p> <p>2. Learn different types of industrial processes and optimize the process using tools like LINDO and LINGO</p> <p>3. Apply load management to reduce demand of electricity during peak time 4: Apply different energy saving opportunities in</p>

				industries
36	PSPE 53	POWER SYSTEM TRANSIENTS	2021	<ol style="list-style-type: none"> 1. Knowledge of various transients that could occur in power system and their mathematical formulation 2. Ability to design various protective devices in power system for protecting equipment and personnel 3. Coordinating the insulation of various equipments in power system 4. Modelling the power system for transient analysis
37	PSPE 54	DYNAMICS OF LINEAR SYSTEMS	2021	<ol style="list-style-type: none"> 1. To learn linear system modeling, analysis and design so as to obtain the ability to apply the same to engineering problems in a global perspective 2. Design observers and controllers for linear systems 3. Acquire Knowledge of discrete time linear systems modeling, analysis and design. 4. Know the stability analysis using Lyapunov methods
38	PSPE 55	MODELING AND ANALYSIS OF HVDC TRANSMISSION SYSTEMS	2021	<ol style="list-style-type: none"> 1. Gain the knowledge on Converter and HVDC system control, Harmonic and Torsional interactions 2. Appreciate different components for the analysis of AC-DC systems and their power flow analysis 3. Be aware of Transient Stability and Dynamic Stability and power modulation of AC-DC systems 4. Simulate HVDC systems and Converters
39	PGOE 11	BUSINESS ANALYTICS	2021	<ol style="list-style-type: none"> 1. The knowledge of data analytics. 2. The ability of think critically in making decisions based on data and deep analytics. 3. The ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. The ability to translate data into clear, actionable insights.
40	PGOE 12	INDUSTRIAL SAFETY	2021	<ol style="list-style-type: none"> 1. Understand the preventive steps for industrial safety 2. Apply the corrosion prevention methods 3. Find the causes and tracking of faults in machine tools and equipment 4. Understand the periodic and preventive maintenance of mechanical and electrical equipment
41	PGOE 13	OPERATIONS	2021	<ol style="list-style-type: none"> 1. Apply the dynamic programming to solve problems of discreet

		RESEARCH		and continuous variables. 2. Apply the concept of non-linear programming 3. Carry out sensitivity analysis 4. Model the real world problem and simulate it.
42	PGOE 14	COST MANAGEMENT OF ENGINEERING PROJECTS	2021	1. Understand the cost concepts in decision - making 2. Commission, execute and manage Engineering projects 3. Apply the quality management techniques in the execution of projects 4. Apply the quantitative techniques for cost management of projects
43	PGOE 15	COMPOSITE MATERIALS	2021	1. Demonstrate the characteristics of composite materials and composite performance 2. Understand the use of fibres as reinforcement 3. Understand the manufacturing process of metal and polymer matrix composites 4. Demonstrate the failure criteria
44	PGOE 16	ENERGY GENERATION FROM WASTES	2021	1. Demonstrate the energy generation from wastes 2. Understand the biomass pyrolysis and gasification 3. Design, construct and operate biomass combustors 4. Develop bio-energy system.

Electrical & Communication Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA101	Mathematics-I	2021	1. analyze differential equations and solve them 2. apply differential equations to engineering problems. 3. Use transformation to convert one type into another type presumably easier to solve. 4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients. 5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform. 6. expand functions as power series using

				<p>Maclaurin's and Talor's series</p> <p>7. optimize the problems related to OR, Computer science, Probability and Statistics</p> <p>8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions enclosing curve tracing method to find length, area, volume.</p> <p>9. use multiple integral in evaluating area and volume of any region bounded by the given curves.</p>
2	PY102	ModernPhysics	2021	<p>1. develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses</p> <p>2. understand the quantum mechanics and ultimately the quantum behavior of charged particles when they are in motion.</p> <p>3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems</p> <p>4. apply knowledge of band theory in the area of electronics and understanding the basic electron transportation phenomenon in microdevices.</p> <p>5. understand the principles in electrostatics and electromagnetics and magnetic properties of materials.</p> <p>6. understand size depended properties of nano-dimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices.</p> <p>7. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.</p> <p>8. learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.</p>

				9. provide multidisciplinary experiences throughout the curriculum. [
3	CS103	Programmingfor ProblemSolving	2021	<ol style="list-style-type: none"> 1. Develop and test programs in C and correct syntax and logical errors. 2. Implement conditional branching, iteration and recursion. 3. Decompose a problem into functions and synthesize a complete program. 4. Use arrays, pointers, strings and structures to formulate algorithms and programs 5. Use files to perform read and write operations. 6. Handle programming assignments based on class,abstraction, encapsulation, overloading and inheritance.
4	EC 104	ElectronicDevices	2021	<ol style="list-style-type: none"> 1. understand the principles of semiconductor physics of the intrinsic, p and n type materials. 2. understand the characteristics of the diode and some special function diodes and their application in electronic circuits. 3. use mathematics to analyze electronic devices typical of those in switching and rectifier circuits. 4. understand and utilize the mathematical models of semiconductor junctions and transistors for circuits and systems. 5. understand the characteristics of the Transistors and opto-electronic devices and their application in electronic circuits. 6. Apply thyristors in power switching and control circuits.
5	ME105	Workshop / Manufacturing Practices	2021	Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricatecomponents using different materials.
6	CS106	Programmingfor Problem Solving Lab	2021	<ol style="list-style-type: none"> 1. Develop the C code for the given algorithm. 2. Understand, debug and trace the execution of

				programs written in C language.
7	CE 107	Environmental Science	2021	<p>1. acquire knowledge in</p> <ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> diverse components of environment and natural resources <input type="checkbox"/> <input type="checkbox"/> ecosystem and biodiversity & its conservation methods <input type="checkbox"/> <input type="checkbox"/> population growth and human health <input type="checkbox"/> <input type="checkbox"/> green technology <p>2. identify and resolve the issues related to sources of different types of pollutions</p> <p>3. provide solutions to individuals, industries and government for sustainable development of natural resources</p> <p>4. apply environmental ethics in protection of diversified ecosystems.</p>
8	MA201	Mathematics–II	2021	<p>1. use ranks of matrices to decide whether the system of linear equations is consistent or not</p> <p>2. use Cayley-Hamilton theorem to find inverses or powers of matrices.</p> <p>3. use Eigen values and vectors to reduce Quadratic forms to normal form.</p> <p>4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. use Green’s theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. use Stokes’ theorem to give a physical interpretation of the curl of a vector field</p> <p>7. use the divergence theorem to give a physical interpretation of the divergence of a vector field</p>
9	CY202	Engineering Chemistry	2021	<p>1. analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.</p> <p>2. rationalize bulk properties and processes using thermodynamic considerations.</p>

				<p>3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques</p> <p>4. rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.</p> <p>5. list major chemical reactions that are used in the synthesis of molecules.</p>
10	EN 203	English	2021	<p>1. learn the elements of grammar and composition of English Language.</p> <p>2. Learn literary texts such as Short stories and prose passages.</p> <p>3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation.</p> <p>4. develop communication skills by cultivating the habit of reading comprehension passages.</p> <p>5. develop the language skills like listening, speaking, reading and writing.</p> <p>6. Make use of self-instructed learner friendly modes of language learning through competence.</p>
11	EN206	English Communication Lab	2021	The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
12	MA301B	Mathematics– III	2021	At the end of this course students will demonstrate the ability to
13	EC302C	-NetworkTheory	2021	<p>1. Understand basics electrical circuits with nodal and mesh analysis.</p> <p>2. Appreciate electrical network theorems.</p> <p>3. Apply Laplace Transform for steady state and transient analysis.</p> <p>4. Determine different network functions.</p>
14	EC303C	Signals and Systems	2021	<p>1. Differentiate between various types of signals and understand the implication of operations of signals</p> <p>2. Understand and classify systems based on the</p>

				<p>impulse response behavior of both continuous-time and discrete-time systems</p> <p>3. Perform domain transformation from time to frequency and understand the energy distribution as a function of frequency</p> <p>4. Usefulness of convolution for analyzing the LTI systems and understand the concepts of power spectral density through correlation.</p> <p>5. Solve differential and difference equations with initial conditions using Laplace and Z- transforms</p>
15	EC304C	ElectroMagneticWavesandTransmissionLines	2021	<p>1. Solve electric field intensity and electric flux density in Electrostatic fields.</p> <p>2. Solve magnetic field intensity and magnetic flux density in Magnetostatic fields.</p> <p>3. Analyze Maxwell's equations in static fields, time varying fields, time harmonic fields and study Uniform plane wave characteristics.</p> <p>4. Compute reflection coefficient and transmission coefficient of waves at media interface.</p> <p>5. Understand characteristics of high frequency transmission lines and its applications.</p>
16	EC305C	DigitalLogicDesign	2021	<p>1. Design and analyze combinational logic circuits.</p> <p>2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder.</p> <p>3. Design & analyze synchronous sequential logic circuits.</p> <p>4. Use HDL & appropriate EDA tools for digital logic design and simulation.</p>
17	EC306C	AnalogCircuits	2021	<p>1. Design and analyze various amplifier circuits.</p> <p>2. Design sinusoidal oscillators.</p> <p>3. Understand the functioning of OP-AMP and design OP-AMP based circuits.</p>
18	EC309S	EntrepreneurshipandDesignThinking	2021	<p>1. Able to know the concepts related to Entrepreneurship & design thinking.</p>

				<p>2. Explain the fundamentals of Design Thinking and innovation and will equip with design thinking techniques for solving problems in various sectors.</p> <p>3. Analyse to work in a multidisciplinary environment and Evaluate the value of creativity</p> <p>4. Formulate specific problem statements of real time issues</p>
19	MC310A	ConstitutionofIndia	2021	<p>1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.</p> <p>2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</p> <p>3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. Discuss the passage of the Hindu Code Bill of 1956.</p>
20	EC307L	BasicElectricalEngineeringLaboratory	2021	<p>CO1: Get an exposure to common electrical components and their ratings.</p> <p>CO2: Make electrical connections by wires of appropriate ratings.</p> <p>CO3: Understand the usage of common electrical measuring instruments.</p> <p>CO4: Understand the basic characteristics of transformers and electrical machines</p>
21	EC308L	ElectronicDevicesLaboratory	2021	<p>CO1: Plot the characteristics of electronic devices to understand their behaviour.</p> <p>CO2: Design, construct and test amplifier circuits, Rectifiers, Special devices and interpret the results.</p>

				CO3: Operate electronic test equipment using hardware/software tools to characterize the behaviour of devices and circuits.
22	EC311L	SimulationLaboratory	2021	CO1: Learn how to use the MATLAB software and know syntax of MATLAB programming. CO2: Understand how to simulate different types of signals and system response. CO3: Find the Fourier Transform of a given signal and plot amplitude and phase characteristics. CO4: Analyze the response of different systems when they are excited by different signals and plot power spectral density of signals.
23	EC401C-	LinearControlSystems	2021	1. Identify the various control system components and their representations. 2. Analyze the various time domain parameters. 3. Analysis the various frequency response plots and its system. 4. Apply the concepts of various system stability criterions and design various transfer functions of digital control system using state variable models.
24	EC402C-	ProbabilityTheoryandStochasticProcesses	2021	1. Understand representation of random signals. 2. Obtain Distribution function, Density functions, and Conditional density functions for different Random variables. 3. Make use of theorems related to random signals. 4. Investigate temporal and spectral characteristics of random processes. 5. Able to Model of different Noise Sources and understand propagation of random signals in LTI systems.
25	HS403C-	ManagerialEconomicsandAccountancy	2021	1. Understand Macro Economic environment of the business and its impact on enterprise.

				<p>2. Identify various cost elements of the product and its effect on decision making.</p> <p>3. Understand the concepts of financial management and smart investment.</p> <p>4. Prepare the Accounting records and interpret the data for Managerial Decisions.</p>
26	EC404C-	ICApplications	2021	<p>1. Understand the functioning of OP-AMP and design OP-AMP based circuits.</p> <p>2. Understand the functioning of voltage regulators and design IC based voltage regulators,</p> <p>3. Understand the functioning of 555 timer and design 555 timer-based circuits.</p> <p>4. Understand the functioning of PLL and design PLL based circuits.</p> <p>5. Design ADC and DAC circuits</p>
27	EC405C-	AnalogCommunications	2021	<p>CO1: Understand the concepts of various Amplitude, Angle and Pulse Modulation schemes. Understand the concepts of information theory with random processes. (L1)</p> <p>CO2: Apply the concepts to solve problems in analog and pulse modulation schemes. (L2)</p> <p>CO3: Analysis of analog communication system in the presence of noise. (L3)</p> <p>CO4: Compare and contrast design issues, advantages, disadvantages and limitations of various modulation schemes in analog communication systems. (L4)</p> <p>CO5: Solve basic communication problems & calculate information rate and channel capacity of a discrete communication channel. (L5)</p>
28	EC409S-	PythonProgramming	2021	<p>1. Apply the OOP principles and best practices of python programming.</p> <p>2. Write clear and effective pythonic code.</p> <p>3. Create applications using python programming.</p> <p>4. Implementing databases using SQLite and Access databases using python programming.</p>

				<p>5. Understand and feel comfortable in working with web application frameworks.</p> <p>6. Develop APIs required for the web applications using web frameworks like Flask and Fast API.</p>
29	EC406L	-DigitalLogicDesignLaboratory	2021	<p>1. Construct Basic combinational Circuits and Verification of its functionality</p> <p>2. Construct Sequential Circuits and Verification of its functionality</p> <p>3. Write structural, behavioral and data flow models for digital circuits</p> <p>4. Simulate VHDL models of digital circuits</p>
30	EC407L	-AnalogCircuitsLaboratory	2021	<p>1. Know about the usage of equipment/components/software tools used to conduct the experiments in analog circuits.</p> <p>2. Conduct the experiment based on the knowledge acquired in the theory about various analog circuits using BJT/MOSFETs to find the important parameters of the circuit (viz. Voltage gain, Current gain, bandwidth, input and output impedances etc) experimentally.</p> <p>3. Analyze the given analog circuit to find required important metrics of it theoretically and Compare the experimental results with that of theoretical ones and infer the conclusions.</p> <p>4. Draw the relevant graphs between important metrics of the system from the observed measurements</p>
31	EC408L	-ICApplicationsLaboratory	2021	<p>1. Measure the parameters of IC 741 Op-amp.</p> <p>2. Design applications of IC 741 Op-amp</p> <p>3. Realize analog filters using Op-amp.</p> <p>4. Design multivibrators using 555 IC.</p>

Electrical & Communication Engineering M.Tech Communication System

S.No.	Course	Title of the Course	Years of	Course Outcomes
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	Code		Introduction	
1	CSPC 01	Advanced Digital Signal Processing (Common to Signal Processing SPPE01)	2021	<p>CO1 To understand theory of different filters and algorithms</p> <p>CO2 To understand theory of multirate DSP, solve numerical problems and write algorithms</p> <p>CO3 To understand theory of prediction and solution of normal equations</p> <p>CO4 To know applications of DSP at block level</p>
2	CSPC 02	Wireless and Mobile Communication	2021	<p>CO1 Design appropriate mobile communication systems</p> <p>CO2 Apply frequency-reuse concept in mobile communications, and to analyze its effects on interference, system capacity, handoff techniques</p> <p>CO3 Distinguish various multiple-access techniques for mobile communications e.g. FDMA, TDMA, CDMA, and their advantages and disadvantages.</p> <p>CO4 Analyze path loss and interference for wireless telephony and their influences on a mobile-communication system's performance.</p> <p>CO5 Analyze and design CDMA system functioning with knowledge of forward and reverse channel details, advantages and disadvantages of using the technology</p> <p>CO6 Understanding upcoming technologies like 3G, 4G etc</p>
3	CSPE 11	DSP Architecture(Common to Signal Processing SPPE11)	2021	<p>CO1 Identify and formalize architectural level characterization of P-DSP hardware</p> <p>CO2 Ability to design, programming (assembly and C),</p>

				<p>and testing code using Code Composer Studio environment</p> <p>CO3 Deployment of DSP hardware for Control, Audio and Video Signal processing applications</p> <p>CO4 Understanding of major areas and challenges in DSP based embedded systems</p>
4	CSPE 12	Optical Networks	2021	<p>CO1 Contribute in the areas of optical network and WDM network design</p> <p>CO2 Implement simple optical network and understand further technology developments for future enhanced network</p>
5	CSPE 13	Statistical Information Processing	2021	<p>CO1 Characterize and apply probabilistic techniques in modern decision systems, such as information systems, receivers, filtering and statistical operations</p> <p>CO2 Demonstrate mathematical modelling and problem solving using such models</p> <p>CO3 Comparatively evolve key results developed in this course for applications to signal processing, communications systems.</p> <p>CO4 Develop frameworks based in probabilistic and stochastic themes for modelling and analysis of various systems involving functionalities in decision making, statistical inference, estimation and detection.</p>
6	CSPE 21	Cognitive Radio	2021	<p>CO1 Understand the fundamental concepts of cognitive radio networks.</p> <p>CO2 Develop the cognitive radio, as well as techniques</p>

				<p>for spectrum holes detection that cognitive radio takes advantages in order to exploit it.</p> <p>CO3 Understand technologies to allow an efficient use of TVWS for radio communications based on two spectrum sharing business models/policies</p>
7	CSPE 22	Voice and Data Networks (Common to Signal Processing SPPE22)	2021	<p>CO1 Protocol, algorithms, trade-offs rationale</p> <p>CO2 Routing, transport, DNS resolutions</p> <p>CO3 Network extensions and next generation architectures.</p>
8	CSPE 23	Wireless sensor Networks	2021	<p>CO1 Design wireless sensor network system for different applications under consideration</p> <p>CO2 Understand the hardware details of different types of sensors and select right type of sensor for various applications.</p> <p>CO3 Understand radio standards and communication protocols to be used for wireless sensor network based systems and application.</p> <p>CO4 Use operating systems and programming languages for wireless sensor nodes, performance of wireless sensor networks systems and platforms</p> <p>CO5 Handle special issues related to sensors like energy conservation and security challenges</p>
9	CSCP 01	Advanced Digital Signal Processing Lab (Common to Signal Processing SPCP01)	2021	<p>CO1 Design different digital filters in software</p> <p>CO2</p>

				<p>Apply various transforms in time and frequency</p> <p>CO3 Perform decimation and interpolation</p>
10	CSCP 02	Wireless and Mobile Communication Lab	2021	<p>CO1 Understanding Cellular concepts, GSM and CDMA networks</p> <p>CO2 To study GSM handset by experimentation and fault insertion techniques</p> <p>CO3 Understating of 3G communication system by means of various AT commands usage in GSM</p> <p>CO4 Understanding CDMA concept using DSSS kit</p> <p>CO5 To learn, understand and develop concepts of Software Radio in real time environment</p>
11	PGMC 01	Research Methodology and IPR	2021	<p>CO1 understand research problem formulation</p> <p>CO2 analyze research related information</p> <p>CO3 follow research ethics</p> <p>CO4 understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity</p> <p>CO5 understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular</p> <p>CO6 understand that IPR protection provides an incentive to inventors for further research</p>

				work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits
12	PGPA11	English and Research Paper Writing	2021	
13	PGPA13	Sanskrit for Technical Knowledge	2021	1. Understanding basic Sanskrit language 2. Ancient Sanskrit literature about science & technology can be understood 3. Being a logical language will help to develop logic in students
14	PGPA14	Value Education	2021	1. Knowledge of self-development 2. Learn the importance of Human values 3. Developing the overall personality
15	CSPC 03	Antennas and Radiating Systems	2021	CO1 Compute the far field distance, radiation pattern and gain of an antenna for given current distribution CO2 Estimate the input impedance, efficiency and ease of match for antennas CO3 Compute the array factor for an array of identical antennas. CO4 Design antennas and antenna arrays for various desired radiation pattern characteristics.
16	CSPC 04	Advanced Communication Networks	2021	CO1 Understand advanced concepts in Communication Networking. CO2 Design and develop protocols for Communication Networks. CO3 Understand the mechanisms in Quality of Service in networking. CO4 Optimise the Network Design
17	CSPE 31	Satellite Communication	2021	CO1

				<input type="checkbox"/> <input type="checkbox"/> Visualize the architecture of satellite systems as a means of high speed, high range communication system. CO2 <input type="checkbox"/> <input type="checkbox"/> State various aspects related to satellite systems such as orbital equations, subsystems in a satellite, link budget, modulation and multiple access schemes. CO3 <input type="checkbox"/> <input type="checkbox"/> Solve numerical problems related to orbital motion and design of link budget for the given parameters and conditions.
18	CSPE 32	IOT and Applications (Common to Signal Processing SPPE32)	2021	CO1 Understand the concept of IOT and M2M CO2 Study IOT architecture and applications in various fields CO3 Study the security and privacy issues in IOT.
19	CSPE 33	RF and Microwave Circuit Design	2021	CO1 Understand the behavior of RF passive components and model active components. CO2 Perform transmission line analysis CO3 Demonstrate use of Smith Chart for high frequency circuit design CO4 Justify the choice/selection of components from the design aspects. CO5 Contribute in the areas of RF circuit design.
20	CSPE 41	Markov chain and Queuing System	2021	CO1 <input type="checkbox"/> <input type="checkbox"/> Understand Markov Chains and regenerative processes used in modelling a wide variety of systems and phenomena. CO2

				<input type="checkbox"/> <input type="checkbox"/> Model a system as queuing system with some aspect of the queue governed by a random process. CO3 <input type="checkbox"/> <input type="checkbox"/> Understand telecommunication systems modelling using Markov chains with special emphasis on developing queuing models.
21	CSPE 42	Pattern recognition and Machine Learning (Common to Signal Processing SPPC03)	2021	CO1 Study the parametric and linear models for classification CO2 Design neural network and SVM for classification CO3 Develop machine independent and unsupervised learning techniques.
22	CSPE 43	Programmable networks- SDN,NFV	2021	CO1 Understand advanced concepts in Programmable Networks. CO2 Understand Software Defined Networking, an emerging Internet architectural framework. CO3 Implement the main concepts, architectures, algorithms, protocols and applications in SDN and NFV.
23	CSCP 03	Antennas and Radiating Systems Lab	2021	CO1 Determine specifications, design, construct and test antenna. CO2 Explore and use tools for designing, analyzing and testing antennas. These tools include Antenna design and analysis software, network analyzers, spectrum analyzers, and antenna pattern measurement techniques.
24	CSCP 04	Advanced Communication Networks Lab	2021	CO1 Identify the different types of network devices and their functions within a network.

				<p>CO2 Understand and build the skills of sub-netting and routing mechanisms.</p> <p>CO3 Understand basic protocols of computer networks, and how they can be used to assist in network design and implementation.</p>
25	PGPA21	Constitution of India	2021	<ol style="list-style-type: none"> 1. the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. the passage of the Hindu Code Bill of 1956.
26	PGPA22	Pedagogy Studies	2021	<ol style="list-style-type: none"> 1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries? 2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners? 3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?
27	PGPA23	Stress Management by Yoga	2021	<ol style="list-style-type: none"> 1. Develop healthy mind in a healthy body thus improving social health also 2. Improve efficiency
28	PGPA24	Personality Development through Life Enlightenment Skills	2021	<ol style="list-style-type: none"> 1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life 2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity 3. Study of Neetishatakam will help in developing

				versatile personality of students
29	CSMP 01	Mini Project with seminar	2021	<p>CO1 Understand of contemporary / emerging technology for various processes and systems</p> <p>CO2 Share knowledge effectively in oral and written form and formulate</p>
30	CSPE 51	Remote Sensing (Common to Signal Processing SPPE51)	2021	<p>CO1 Understand basic concepts, principles and applications of remote sensing, particularly the geometric and radiometric principles</p> <p>CO2 Provide examples of applications of principles to a variety of topics in remote sensing, particularly related to data collection, radiation, resolution, and sampling.</p>
31	CSPE 52	High Performance Networks	2021	<p>CO1 Apply knowledge of mathematics, probability, and statistics to model and analyze some networking protocols.</p> <p>CO2 Design, implement, and analyze computer networks.</p> <p>CO3 Identify, formulate, and solve network engineering problems</p> <p>CO4 Show knowledge of contemporary issues in high performance computer networks. Use techniques, skills, and modern networking tools necessary for engineering practice</p>
32	CSPE 53	MIMO Systems	2021	<p>CO1 Understand channel modelling and propagation, MIMO Capacity, space-time coding</p> <p>CO2 MIMO receivers, MIMO for multi-carrier systems (e.g. MIMO-OFDM), multi-user communications, multi-user MIMO.</p>

				<p>CO3 Understand cooperative and coordinated multi-cell MIMO, introduction to MIMO in 4G (LTE, LTE-Advanced, WiMAX).</p> <p>CO4 Perform Mathematical modelling and analysis of MIMO systems.</p>
33	PGOE 11	Business Analytics	2021	<p>1. knowledge of data analytics.</p> <p>2. the ability of think critically in making decisions based on data and deep analytics.</p> <p>3. the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.</p> <p>4. the ability to translate data into clear, actionable insights.</p>
34	PGOE 13	Operation Research	2021	<p>1. apply the dynamic programming to solve problems of discreet and continuous variables.</p> <p>2. apply the concept of non-linear programming</p> <p>3. carry out sensitivity analysis</p> <p>4. model the real world problem and simulate it.</p>
35	CSPD 01	Dissertation Phase-I	2021	<p>CO1 Ability to synthesize knowledge and skills previously gained and applied to an indepth study and execution of new technical problem</p> <p>CO2 Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design</p> <p>CO3 Ability to present the findings of their technical solution in a written report</p>

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SPPC 01	Advanced Digital Signal Processing	2021	CO1 To understand theory of different filters and algorithms CO2 To understand theory of multirate DSP, solve numerical problems and write algorithms CO3 To understand theory of prediction and solution of normal equations CO4 To know applications of DSP at block level
2	SPPC 02	Digital Image Video Processing	2021	CO1 Learn different techniques for image enhancement, video and image recovery CO2 Understand techniques for image and video segmentation CO3 Study techniques for image and video compression and objectrecognition
3	SPPE 11	DSP Architecture	2021	CO1 Identify and formalize architectural level characterization of P-DSP hardware CO2 Ability to design, programming (assembly and C), and testing code using Code Composer Studio environment CO3 Deployment of DSP hardware for Control, Audio and Video Signal processing applications CO4 Understanding of major areas and challenges in DSP based embedded system
4	SPPE 12	Computer Vision	2021	CO1 Study the image formation models and feature extraction for computer vision CO2 Identify the segmentation and motion detection and estimation techniques CO3 Develop small applications and detect the objects in various applications
5	SPPE 21	Joint time frequency analysis and multiresolution analysis(JTFA and MRA)	2021	<ul style="list-style-type: none"> • Introduction to Transforms in signal processing • To understand Time -Frequency Analysis & Multiresolution • Analysis Study of Wavelets and its Applications
6	SPPE 22	Voice and Data Networks	2021	CO1 Protocol, algorithms, trade-offs rationale CO2 Routing, transport, DNS resolutions CO3 Network extensions and next generation architectures.
7	SPPE 23	Audio Video Coding & Compression	2021	CO1 Familiarity to lossy and lossless compression systems. CO2 Study of Video coding techniques and standards. CO3 Understand audio coding and multimedia synchronization techniques.
8	SPCP 01	Advanced Digital Signal Processing Lab	2021	CO1 Design different digital filters in software CO2

				Apply various transforms in time and frequency CO3 Perform decimation and interpolation
9	SPCP 02	Digital Image Video Processing Lab	2021	CO1 Perform image and video enhancement CO2 Perform image and video segmentation CO3 Detect an object in an image/video
10	PGMC 01	Research Methodology and IPR	2021	1. understand research problem formulation. 2. analyze research related information 3.follow research ethics 4.understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5.understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular 6.understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
11	PGPA11	English and Research Paper Writing	2021	1. Understand that how to improve your writing skills and level of readability 2. Learn about what to write in each section 3. Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission
12	PGPA12	Disaster Management	2021	1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. 2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. 3. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their

				home country or the countries they work in
13	PGPA13	Sanskrit for Technical Knowledge	2021	1. Understanding basic Sanskrit language 2. Ancient Sanskrit literature about science & technology can be understood 3. Being a logical language will help to develop logic in students
14	PGPA14	Value Education	2021	1.Knowledge of self-development 2.Learn the importance of Human values 3.Developing the overall personality
15	SPPC 03	Pattern Recognition and Machine Learning	2021	CO1 Study the parametric and linear models for classification CO2 Design neural network and SVM for classification CO3 Develop machine independent and unsupervised learning techniques
16	SPPC 04	Detection and Estimation Theory	2021	CO1 Understand the mathematical background of signal detection and estimation CO2 Use classical and Bayesian approaches to formulate and solve problems for signal detection and parameter estimation from noisy signals. CO3 Derive and apply filtering methods for parameter estimation.
17	SPPE 31	Advanced Computer Architecture	2021	CO1 Understand parallelism and pipelining concepts, the design aspects and challenges. CO2 Evaluate the issues in vector and array processors. CO3 Study and analyze the high performance scalable multithreaded and multiprocessor systems.
18	SPPE 32	IOT and Applications	2021	CO1 Understand the concept of IOT and M2M CO2 Study IOT architecture and applications in various fields CO3 Study the security and privacy issues in IOT.
19	SPPE 33	Digital Design and Verification	2021	CO1 Familiarity of Front end design and verification techniques and create reusable test environments. CO2 Verify increasingly complex designs more efficiently and effectively. CO3 Use EDA tools like Cadence, Mentor Graphics.
20	SPPE 41	Multispectral Signal Analysis	2021	CO1 Select appropriate hyper spectral data for a particular application CO2 Understand basic concepts of data acquisition and image processing tasks required for multi and hyper spectral data analysis CO3 Learn techniques for classification and analysis of multi and hyper spectral data.

21	SPPE 42	Audio Processing	2021	CO1 Understand different characteristics of Speech. CO2 Identify and analyze different speech analysis system. CO3 Write algorithms for Recognition of speech.
22	SPPE 43	Biomedical Signal Processing	2021	CO1 Understand different types of biomedical signal. CO2 Identify and analyze different biomedical signals CO3 Find applications related to biomedical signal processing
23	SPCP 03	Pattern Recognition and Machine Learning Lab	2021	CO1 Perform image and video enhancement CO2 Perform image and video segmentation CO3 Detect an object in an image/video
24	SPCP 04	Detection and Estimation Theory Lab	2021	CO1 Simulate signals and noise CO2 Detect signals in the presence of noise CO3 Compare various estimation techniques
25	PGPA21	Constitution of India	2021	1. the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. the passage of the Hindu Code Bill of 1956.
26	PGPA22	Pedagogy Studies	2021	1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries? 2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners? 3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?
27	PGPA23	Stress Management by Yoga	2021	1. Develop healthy mind in a healthy body thus improving social health also 2. Improve efficiency
28	PGPA24	Personality Development through Life Enlightenment Skills	2021	CO1 Understand of contemporary / emerging technology for various processes and systems CO2 Share knowledge effectively in oral and written form

				and formulate documents.
29	SPMP 01	Mini Project with seminar	2021	CO1 Understand of contemporary / emerging technology for various processes and systems CO2 Share knowledge effectively in oral and written form and formulate documents.
30	SPPE 51	Remote Sensing	2021	CO1 Understand basic concepts, principles and applications of remote sensing, particularly the geometric and radiometric principles CO2 Provide examples of applications of principles to a variety of topics in remote sensing, particularly related to data collection, radiation, resolution, and sampling.
31	SPPE 52	Optimization Techniques	2021	CO1 Understand importance of optimization CO2 Apply basic concepts of mathematics to formulate an optimization problem CO3 Analyze and appreciate variety of performance measures for various optimization problems
32	SPPE 53	Modelling and Simulation Techniques	2021	CO1 Identify and model discrete systems (deterministic and random) CO2 Identify and model discrete signals (deterministic and random) CO3 Understand modelling and simulation techniques to characterize systems/proc
33	PGOE 11	Business Analytics	2021	1. knowledge of data analytics. 2. the ability of think critically in making decisions based on data and deep analytics. 3. the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. the ability to translate data into clear, actionable insights.
34	PGOE 13	Operation Research	2021	1. apply the dynamic programming to solve problems of discreet and continuous variables. 2. apply the concept of non-linear programming 3. carry out sensitivity analysis 4. model the real world problem and simulate it.
35	SPPD 01	Dissertation Phase-I	2021	CO1 Ability to synthesize knowledge and skills previously gained and applied to an in- depth study and execution of new technical problem CO2 Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design CO3 Ability

				to present the findings of their technical solution in a written report.
36	SPPD 02	Dissertation Phase- II	2021	CO1 Ability to synthesize knowledge and skills previously gained and applied to an in- depth study and execution of new technical problem CO2 Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design CO3 Ability to present the findings of their technical solution in a written report.

Mechanical Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA101	Mathematics – I	2021	1. analyze differential equations and solve them 2. apply differential equations to engineering problems. 3. Use transformation to convert one type into another type presumably easier to solve. 4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients. 5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform. 6. expand functions as power series using Maclaurin's and Talor's series 7. optimize the problems related to OR, Computer science, Probability and Statistics 8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions enclosing curve tracing method to find length, area, volume. 9. use multiple integral in evaluating area and volume of any region bounded by the given curves.
2	CY 101	Engg Chemistry	2021	1. analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. 2. rationalize bulk properties and processes using thermodynamic considerations. 3. distinguish the

				<p>ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques</p> <p>4. rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.</p> <p>5. list major chemical reactions that are used in the synthesis of molecules.</p>
3	EN103	English	2021	<p>1. learn the elements of grammar and composition of English Language.</p> <p>2. Learn literary texts such as Short stories and prose passages.</p> <p>3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation.</p> <p>4. develop communication skills by cultivating the habit of reading comprehension passages.</p> <p>5. develop the language skills like listening, speaking, reading and writing. Make use of self-instructed learner friendly modes of language learning through competence</p>
4	EE104	Basic Electrical and Electronics Engineering	2021	<p>1. understand the basic concepts of D.C. single phase and 3- phase supply and circuits and solve basic electrical circuit problems</p> <p>2. understand the basic concepts of transformers and motors used as various industrial drives</p> <p>3. understand the concept of power factor improvement for industrial installations and concepts of most economical power factor</p> <p>4. understand the operation and characteristics of diodes, transistors, integrated circuits and digital circuits.</p>
5	ME105	Engineering Graphics and Design	2021	<p>1. make a distinction between first angle projection and third angle projection of drawing.</p> <p>2 draw hyperbola, parabola, Involutives and Cycloidal curves.</p> <p>3. draw sections of solids including cylinders, cones, prisms and pyramids.</p> <p>4. draw projections of lines, planes, solids and sections of solids. draw orthographic projections of lines, planes, and solids.</p>
6	EN 106	English Communication Lab	2021	<p>The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.</p>

7	MA201	Mathematics – II	2021	<p>1. use ranks of matrices to decide whether the system of linear equations is consistent or not 2. use Cayley-Hamilton theorem to find inverses or powers of matrices. 3. use Eigen values and vectors to reduce Quadratic forms to normal form. 4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications. 5. use Green’s theorem to evaluate line integrals along simple closed contours on the plane 6. use Stokes’ theorem to give a physical interpretation of the curl of a vector field 7. use the divergence theorem to give a physical interpretation of the divergence of a vector field. 8. find the Fourier Series to represent a function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic phenomenon. 9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions. 10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena</p>
8	PY 202	Engineering Physics	2021	<p>1. Develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses 2. understand the quantum mechanics and ultimately the quantum behavior of charged particles when they are in motion. 3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems 4. apply the basic principles of Mechanics of rigid body and continuous media and their applications understand the principles in electrostatics and electromagnetics and magnetic properties of materials. 5. understand size depended properties of nano-dimensional materials and their effective utilization in making</p>

				nano- and micro-devices for further microminiaturization of electronic devices. 6. think and participate deeply, creatively, and analytically in emerging areas of engineering technology. 7. Learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis. 8. provide multidisciplinary experiences throughout the curriculum
9	CS 203	Programming for Problem Solving	2021	1. Develop and test programs in C and correct syntax and logical errors. 2. Implement conditional branching, iteration and recursion. 3. Decompose a problem into functions and synthesize a complete program. 4. Use arrays, pointers, strings and structures to formulate algorithms and programs 5. Use files to perform read and write operations. 6. Handle programming assignments based on class, abstraction, encapsulation, overloading and inheritance.
10	CE 204	Engineering Mechanics	2021	1. apply the basic knowledge of force system. 2. know the types of supports occur in civil engineering structures 3. know the geometrical properties of different cross sections. 4. understand different types of stresses and strains, elastic constants. 5. understand the behavior of different internal forces under different types of loading
11	ME 205	Workshop / Manufacturing Practices	2021	:Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials
12	CS 206	Programming for Problem Solving Lab	2021	1. Develop the C code for the given algorithm. 2. Understand, debug and trace the execution of programs written in C language
13	CE 207	Environmental Science	2021	1. acquire knowledge in • diverse components of environment and natural resources • ecosystem and biodiversity & its conservation methods • population growth and human health • green technology 2.

				identify and resolve the issues related to sources of different types of pollutions 3. provide solutions to individuals, industries and government for sustainable development of natural resources 4. apply environmental ethics in protection of diversified ecosystems.
14	MA301B	Mathematics – III	2021	1. After the completion of course, students will be able to Understand the analyticity of complex functions and conformal mappings. 2. Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours. 3. Describe basic properties of complex integration and having the ability to compute such integrals. 4. Describe conformal mappings between various plane regions. 5. Apply the concepts of Complex Analysis in many branches of Engineering, including the branches of hydrodynamics, thermodynamics, and particularly quantum mechanics. 6. Compute the residue of a function and use the Residue Theory to evaluate a contour integral or an integral over the real line. 7. Formulate/solve/classify the solutions of Partial differential equations. 8. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method. 9. Apply Variables separable methods to solve boundary value problems. 10. Find the solution of one dimensional wave equation, heat equation and Laplace equation.
15	ME302C	Strength of Materials	2021	CO1 Analyze the statically determinate and indeterminate problems CO2 Determine the stresses and strains in the members subjected to axial, bending and torsional loads CO3 Evaluate the slope and deflection of beams subjected to loads CO4 Determine the principalstresses and strains in structural members CO5 Determine the torsionalstress of structural beam
16	HS303C	Managerial Economics and Accountancy	2021	CO1 Understand Macro Economic environment of the business and its impact on enterprise. CO2

				Identify various cost elements of the product and its effect on decision making. CO3 Understand the concepts of financial management and smart investment. CO4 Prepare the Accounting records and interpret the data for Managerial Decisions.
17	ME304C	Manufacturing Processes	2021	CO 1 Able to understand the basic concepts of manufacturing. CO 2 Able to select suitable manufacturing process to produce products of desired size and shape. CO3 Able to understand the basic manufacturing processes such as foundry and metal forming processes etc. CO4 Ability to distinguish between gas welding and arc welding fabrication processes.
18	ME305C	Basic Thermodynamics	2021	<ul style="list-style-type: none"> ➤ After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions ➤ Students can evaluate changes in thermodynamic properties of substances ➤ The students will be able to evaluate the performance of energy conversion devices ➤ The students will be able to differentiate between high grade and low grade energies. ➤ The students will be able to evaluate the performance of air standard cycles.
19	MC310A	Constitution of India	2021	<ol style="list-style-type: none"> 1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. Discuss the passage of the Hindu Code Bill of 1956.
20	ME401C	Fluid Mechanics and Hydraulic Machinery	2021	CO1 Understand and analyze simple flow situations and solve fluid flow problems. CO2 Classify flows

				and evaluate the flow through pipes and laminar flows. CO3 Apply the knowledge of boundary layer theory and dimensional analysis. CO4 Design and evaluate the performance of centrifugal and reciprocating pumps. CO5 Design and analyze the characteristics of turbines
21	ME402C	Kinematics of Machinery	2021	CO1 Understand the principles of kinematic pairs, chains and their classification, DOF, inversions, equivalent chains and planar mechanisms. CO2 Acquire knowledge and develop straight line motion mechanisms and steering mechanisms. CO3 Able to draw velocity and acceleration diagrams for different mechanisms. CO4 Able to design and develop gear and gear train depending on application. CO5 Design cams and followers for specified motion profiles.
22	ME403C	Applied Thermodynamics	2021	CO1 Understand the Ist law analysis of combustion reactions CO2 Understanding of various steam power cycles, boilers and droughts. CO3 Acquire the knowledge about the steam generators and steam properties CO4 Acquire the knowledge on compressible flows of nozzles CO5 Acquire the knowledge on the performance of steam turbines.
23	ME404C	Advanced Engineering Graphics	2021	CO1 Able to draw Projections of solids and Auxiliary projections of solids parallel to one plane perpendicular to both the planes CO2 Able to analyze and draw section of solids inclined to both the planes CO3 Able to develop surfaces of solids which are perpendicular to both the planes CO4 Able to draw interpretation of solids in any angle CO5 Able to draw isometric projections of simple objects
24	ME405C	Machine Tools and Metal Cutting	2021	CO 1 Able to understand the basic concepts of metal cutting and basic machine tools of workshop practice. CO 2 Able to make a distinction between machine tools employing single point cutting tool and multipoint cutting tool. CO3 Prepared to cut gear teeth on a given job on a milling machine by

				adopting suitable indexing method. CO4 Ability to understand the basic features of Capstan and Turret lathes and machining by abrasive grains.
25	ME406L	Fluid Mechanics and Hydraulic Machinery Lab	2021	CO1 Able to calibrate the flow measuring devices CO2 Able to calculate loss coefficients for use in the pipe flow analysis. CO3 Able to prepare the characteristic curves for the pumps.
26	ME407L	IC Engines Lab	2021	CO1 Estimate energy distribution by conducting heat balance test on IC engines. CO2 Conduct constant speed and variable speed tests on IC engines and interpret their performance. CO3 Evaluate the performance of air compressor.
27	ME408L	Electronics and Electrical Engineering Lab	2021	CO1 Verify Network Theorem and analysis of Electrical Circuits CO2 Understand the Significance and performance of DC Machines and Single phase Transformers CO3 Design and analyze various Rectifiers & Logic Gates
28	ME409S	MATLAB	2021	CO 1 Able to understand the basic features of MATLAB platform CO 2 Able to distinguish between Script file and Function file CO3 Prepared to write simple programmes and to solve systems of linear algebraic equations – that is problem solving techniques. CO4 Ability to make use of the numerical power of MATLAB in practical applications such as linear regression and interpreting and plotting of complex data with ease

Mechanical Engineering M.Tech (Industrial Engineering)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	IEPC 01	Operations Planning and Control	2021	1. Forecasting principles and techniques for short range and long range planning 2. Production requirements for each product and plan the shop floor activities 3. Work station loading and scheduling of paths to avoid bottle necks for smooth production 4. Solution for product mix decision using OR techniques. 5. Optimal job sequences to achieve the minimum make span with maximum

				production output
2	IEPC 02	Work System Design	2021	1. Work study principle and design effective work layout for minimal hand and body motions. 2. Design process for improvement and design the method study. 3. Estimation of time for each operation through micro motion study so as to eliminate unnecessary movements. 4. Design the ergonomics for effective usage of hand and body motions.
3	IEPE 11	Applied Probability and Statistics	2021	1. Basic concepts of sampling applied in population enumeration. 2. Regression techniques for application and forecast the demand and related variables 3. Testing of hypothesis using statistical distributions. 4. Correlation between the observed values and experimental values for analysis of variance.
4	IEPE 12	Financial Management & Control	2021	1. Clearly understand the cost management discipline and process 2. Recognise potential pitfalls and understand avoidance strategies 3. Use a cost management estimation and control plan 4. Understand the process and importance of Cost Estimation, Cost Budgeting and Cost Control
5	IEPE 13	Human Resource Management	2021	1. Critically evaluate and apply theories and models of HRM that explain the nature and significance of key HRM practices and HRM outcomes as they relate to diverse organisational contexts. 2. Critically analyse and apply the emerging strategic role that HRM plays in a changing business environment and workplace to maintain current policies and procedures 3. Analyse and align HR systems and processes to leadership strategies and objectives in contemporary organisations to promote best practice in HR performance. 4. Identify and evaluate key organisational approaches to improving HR outcomes for both the organisation and its employees 5. Critically analyse employee-employer issues using relevant ethical and legal processes and approaches to solve problems.

6	IEPE 21	Design for Manufacturing	2021	<ol style="list-style-type: none"> 1. Design components for machining 2. Simulate the casting design and choose the best casting process for a specific product. 3. Evaluate the effect of thermal stresses in weld joints 4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation mechanisms 5. Design plastic components for machining and joining and selecting a proper processes for different joining cases
7	IEPE 22	Marketing Management	2021	<ol style="list-style-type: none"> 1. State the role and functions of marketing within a range of organizations. 2. Describe key marketing concepts, theories and techniques for analysing a variety of marketing situations. 3. Use written formats to communicate marketing outcomes. 4. Apply the introduced conceptual frameworks, theory and techniques to various marketing contexts. 5. Synthesise ideas into a marketing plan.
8	IEPE 23	Facilities Planning	2021	<ol style="list-style-type: none"> 1. Able to know the concept of facilities planning that aid in design of Product, Process and schedule design. 2. Able to design Material handling equipment for industrial and non industrial purpose. 3. Able to design handling, receiving and shipping of goods using computer aided layout software. 4. Able to solve Problems of ware house, conveyor and allocation models using quantitative approach. 5. Able to simulate the waiting line models, storage models and conveyor models using simulation software.
9	IECP 01	Industrial Engineering Lab-I	2021	<ol style="list-style-type: none"> 1. To pursue the method adopted in performing the operation. 2. Understanding of reliable and flexible method to accomplish hectic task in minimum possible time. 3. To record the human activities during working conditions using scientific methods. 4. To study the performance rating of individual worker and to cost accordingly 5. Development of new techniques to minimize the bottlenecks
10	IECP 02	Simulation Lab - I	2021	<ol style="list-style-type: none"> 1. Able to understand the basic programming knowledge with respect to domain. 2. Able to

				develop a program to solve N job 2 machine problem using C software, and to develop a program in C to solve inventory price breaks problem 3. Able to solve inventory control problem for Two Phase Method 4. Able to solve queuing theory problems in Big M-Method. 5. Able to solve linear programming and non-linear programming problems using Simplex Method
11	PGMC 01	Research Methodology and IPR	2021	At the end of this course, students will be able to Understand research problem formulation. Analyze research related information Follow research ethics Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
12	IEPC 03	Advanced Operation Research	2021	1. Able to solve nonlinear problems using Kuhn Tucker conditions. 2. Able to solve Un-constrained and constrained minimization problems using programming methods. 3. Ability to solve multi objective problems using Goal programming. 4. Able to develop meta heuristic algorithms to solve optimization problems.
13	IEPC 04	Quality Control and Reliability Engineering	2021	1. Able to maintain quality in products using quality circle principles. 2. Able to apply statistical methods to accept the lot of samples. 3. Able to increase the reliability of product through statistical approach. 4. Able to judge whether the lots of samples are to be accept or reject. 5. Learn fundamentals of reliability management and risk assessment

14	IEPE 31	Supply Chain Management	2021	<p>1. Managerial decision plans for effective implementation with competitive supplies</p> <p>2. Demand of the materials and maintain zero inventories with proper supply chain.</p> <p>3. Manufacturing operations and allocation of resources for optimal production.</p> <p>4. Proper sales market so as to plan the MRP and lean manufacturing concepts</p> <p>5. Logistics for purchasing raw materials and maintain continuous chain with suppliers and customers</p>
15	IEPE 32	Project Management	2021	<p>1. Better understanding of the project principles and project life cycle so as to avoid the project delays and the design stage itself to arrive at the Break-even point</p> <p>2. Better analysis of the project planning, the role and responsibility of the team work in the assignment of jobs</p> <p>3. Organization structure the responsibilities and role of leaders and team management</p> <p>4. Process of implementation of performance measurements for better productivity and project process control</p>
16	IEPE 33	Discrete Event System Simulation	2021	<p>1. Classify various simulation models and give practical examples for each category</p> <p>2. Construct a model for a given set of data and motivate its validity</p> <p>3. Generate and test random number variates and apply them to develop simulation models</p> <p>4. Analyze output data produced by a model and test validity of the model</p> <p>5. Explain parallel and distributed simulation methods</p>
17	IEPE 41	Productivity Engineering & Management	2021	<p>1. Identification and formulation productivity measurement at national level with diversity concepts</p> <p>2. Development of suitable software for productive evaluation based on objective matrix and decision tree</p> <p>3. Identification of long term and short term productive models in industry for improvement of the productivity</p> <p>4. University-industry interaction for entrepreneurship development and technology transfer</p>
18	IEPE 42	Logistics Engineering & Management	2021	<p>1. An ability to apply the knowledge, techniques,</p>

				skills, and modern tools of the discipline to Engineering Logistics technology; 2. An ability to apply knowledge of engineering, management and technology to Engineering Logistics related issues; 3. An ability to identify analyse and solve Engineering Logistics related issues; 4. An ability to identify, analyse, and solve narrowly defined Engineering Logistics technology problems; 43 Page 5. An ability to apply written, oral, and graphical communications in both technical and non-technical environments and an ability to identify and use appropriate technical and management literature;
19	IEPE 43	Service Engineering & Management	2021	1. Able to acquire knowledge on focusing on customer and service management 2. Able to manage modern control system, BPO and Services marketing 3. Able to maintain good customer relationship, data mining knowledge management 4. Able to apply utility theory, simulation modeling in management science applications.
20	IECP 03	Industrial Engineering Lab-II	2021	1. Understand the forecasting techniques. 2. Understand the control charts for variables and attributes. 3. Understand the development of bills. 4. Understand the processing the charts. 5. Understand the utilization of work sampling.
21	IECP 04	Simulation Lab - II	2021	1. Understand the concept of PERT, Transportation and Queuing models. 2. Understand the solving of sequencing and assignment problem. 3. Understand the Taguchi and response Surface Methodology using DOE. 4. Understand the single & multi response optimization.
22	PGPA 02	Audit Course-II	2021	1. Understanding of key concepts in disaster risk reduction and humanitarian response. 2. Evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. 3. Understanding the development of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. critically understand the strengths and weaknesses of

				disaster management approaches, planning and programming in different countries, particularly their home country or the countries.
23	IEPE 51	Design and Analysis of Experiments	2021	1. Formulate objective(s) and identify key factors in designing experiments for a given problem. 2. Develop appropriate experimental design to conduct experiments for a given problem. 3. Analyze experimental data to derive valid conclusions. 4. Optimize process conditions by developing empirical models using experimental data. 5. Design robust products and processes using parameter design approach.
24	IEPE 52	System Dynamics	2021	1. Ability to develop students' skills in analyzing, simulating, and identifying dynamic systems based upon their input-output responses. 2. Develop and analyze a simulation model that provides a useful explanation of a given problematic behaviour in a narrowly-defined task 3. Able to compare popular social science modeling paradigms such as research economics and cross impact theory
25	PGOP 13	Operation Research	2021	1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables. 2. Students should able to apply the concept of non-linear programming 3. Students should able to carry out sensitivity analysis 4. Student should able to model the real world problem and simulate it.

Mechanical Engineering M.Tech (Product Engineering)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	PEPC 01	Advanced Manufacturing Processes	2021	1. Students can able to demonstrate different unconventional machining processes 2. Able to test the influence of different process parameters on the performance and their applications 3. Able to select the different types of composites for different

				applications.
2	PEPC 02	Advanced material technology	2021	1. Students are capable to define the concept of materials i.e., conventional materials with their structure, such as electronic configuration, structure of atom, etc. 2. Students become aware of different conventional materials such as metallic and non metallic materials, structures and their applications. 3. Students will be able to demonstrate the need for newer materials by comparing the limitations of conventional materials. 4. They will be able to compare the types of newer materials along with their properties and applications. 5. They will be able to compile about the properties, structure of ceramic materials and their need for newer applications and processing techniques.
3	PEPE 11	Applied Probability and Statistics	2021	the end of the course student will be able to learn the 1. Basic concepts of sampling applied in population enumeration. 2. Regression techniques for application and forecast the demand and related variables 3. Testing of hypothesis using statistical distributions. Correlation between the observed values and experimental values for analysis of variance
4	PEPE 12	Operations Planning and Control	2021	1. Forecasting principles and techniques for short range and long range planning 2. Production requirements for each product and plan the shop floor activities 3. Work station loading and scheduling of paths to avoid bottle necks for smooth production 4. Solution for product mix decision using OR techniques. 5. Optimal job sequences to achieve the minimum make span with maximum production output
5	PEPE 13	Advanced Casting Technology	2021	1. Knowing and identification of materials for moulding the additives, coating and the methods of sand controls 2. Identification of different furnaces for metal melting and design the suitable furnace depending materials 3. Understanding of the concepts related to the casting processes and the

				factor those influence the design process for metals and alloys 4. Knowing the various properties of liquid metals and their compositions and attain the various alloys depending upon the temperature, Iron-carbon diagram 5. Understanding the principles of mechanization of foundries with their layouts and purchase of suitable layout
6	PEPE 21	Robotics	2021	1. Importance of robotics in today and future goods production 2. Robot configuration and subsystems 3. Principles of robot programming and handle with typical robot 4. Working of mobile robots 5. The Student must be able to design automatic manufacturing cells with robotic control using the principle behind robotic drive system, end effect ors, sensor, machine vision robot kinematics and programming.
7	PEPE 22	Design for Manufacturing	2021	1. Design components for machining. 2. Simulate the casting design and choose the best casting process for a specific product. 3. Evaluate the effect of thermal stresses in weld joints. 4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation mechanisms. 5. Design plastic components for machining and joining and selecting a proper processes for different joining cases.
8	PEPE 23	Metrology & Computer	2021	1. Metrology, quality control and Inspection so that they can meet the challenges in the industries. 2. Various instruments and measuring systems with the help of laser and other advanced computer integrated systems. 3. Students will be able to measure any type of features, forms with the help of CMM.
9	PECP 01	Production Engineering Lab – I	2021	1. Describe the geometry of single point cutting tool. 2. Apply knowledge of metal cutting to perform various machining operations. 3. Explain the working and use of various components of conventional machine tools. 4. Identify the sequence of operation to process a job
10	PECP 02	CAD Lab	2021	1. Draw complex geometries of machine

				<p>components in sketcher mode. 2. Create complex engineering assemblies using appropriate assembly constraints. 3. Develop G and M codes for turning and milling components. 4. Generate automated tool paths for a given engineering component. 5. Generate automated tool paths for a given engineering component.</p>
11	PGMC 01	Research Methodology and IPR	2021	<p>1. Understand research problem formulation. 2. Analyze research related information 3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 4. Understanding that when IPR would take such important place in growth of individuals & Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. 5. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits</p>
12	PEPC 03	Computer Integrated Manufacturing	2021	<p>1. Understand the effect of manufacturing automation strategies and derive production metrics. 2. Analyze automated flow lines and assembly systems, and balance the line. 3. Design automated material handling and storage systems for a typical production system. 4. Design a manufacturing cell and cellular manufacturing system. 5. Develop CAPP systems for rotational and prismatic parts.</p>
13	PEPC 04	Metal Cutting Tool Design	2021	<p>1. Ability to extend, through modeling techniques, the single point, multiple point and abrasive machining processes 2. Estimate the material removal rate and cutting force, in an industrially useful manner, for practical machining processes 3. Prediction of the surface finish in machining processes 4. Understand the practical aspects of tool wear and tool life, and their influence on economics</p>

				Understand the tool and work piece temperatures and their effect on quality
14	PEPE 31	Automation Manufacturing	2021	1. Solve the line balancing problems in the various flow line systems with and without use buffer storage 2. Understand the different automated material handling, storage and retrieval systems and automated inspection systems. 3. Use of Adaptive Control principles and implement the same online inspection and control
15	PEPE 32	Metal Forming Technology	2021	1. Metal forming fundamentals and applications. 2. Metal forming mechanics. 3. Workability of testing techniques. 4. Tribology in metal forming and other phenomena
16	PEPE 33	Additive Manufacturing	2021	1. Identify the need for time compression in product development and manufacturing. 2. Model and fabricate any complex engineering product. 3. Select the rapid manufacturing technology for a given application. 4. Minimize various errors that are occurring during conversion of CAD models. 5. Illustrate the working principles of various rapid manufacturing technologies. 6. Optimize the quality of parts produced by the various rapid manufacturing technologies.
17	PEPE 41	Energy Management	2021	1. Understanding basics of demand side management and mechanisms (technical, legal or financial) that influence energy consumption. 2. Recognizing opportunities for increasing rational use of alternative energies. 3. Learning the basics of energy auditing with application on different sectors. 4. Able to take the decisions in budget estimations and evaluate risk analysis
18	PEPE 42	Advanced Welding Processes	2021	1. Weld ability and perform different weld ability testing for different metals. 2. Different dissimilar metal and its cladding. 3. Application of preheat and PWHT of weld joints as per codes and standards used in fabrication industry. 4. Knowledge about different methods for increasing service life of equipment

19	PEPE 43	Oil Hydraulics and Pneumatics	2021	<p>1. Identify and analyze the functional requirements of a power transmission system for a given application. (Application involving fluid power transmission) 2. Design an appropriate hydraulic or pneumatic circuit or combination circuit like electro-hydraulics, electro-pneumatics for a given application. Develop a circuit diagram. 3. Visualize how the hydraulic/pneumatic circuit will work to accomplish the function. 4. Selection and sizing of components of the circuit.</p>
20	PEPE 51	Finite Element Methods	2021	<p>1. Able to design, set up, and conduct engineering experiments and analyze the results. 2. An ability to carry out projects and research in interdisciplinary areas. 3. Graduates will possess managerial and leadership skills with professional ethical practices and will understand the proper use of technical papers, copyrights and patents, recent advances in Finite Element Method field. 4. Able to understand the impact of Finite Element Method solutions in a global, economic, environmental, and societal context by participating at national level competitions like technical paper presentation, quiz programs, essay writing competitions, Industrial tours, Alumni association. 5. Recognition of the need for, and an ability to engage in lifelong learning and comprehend the current professional issues.</p>
21	PEPE 52	Expert Systems in Manufacturing	2021	<p>1. Fundamental theories, concepts, and applications of computer science in solving real-time problems. 50 P a g e 2. Able to Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information. 3. Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems. 4. Able to solve the problems in the field of machining, inventory control, process planning with the help of expert systems.</p>
22	PGOP 11	Business Analytics	2021	<p>1. Students will demonstrate knowledge of data analytics. 2. Students will demonstrate the ability of</p>

				think critically in making decisions based on data and deep analytics. 3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. Students will demonstrate the ability to translate data into clear, actionable insights.
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2.6.1: The institution has stated learning outcomes (Generic and Programme specific)/graduate attributes which are integrated into the assessment process and widely publicized through the website and other documents

2020-2021

SVU COLLEGE OF ARTS

1. Adult & Continuing Education

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	MAAE - 1.1	Alternative Learning Systems	2020	1.Remembrance of different forms of learning. 2.Application of different technology support services for effective learning. 3.Organization and administration of nonformal education programmes. 4.Evaluation of nonformal education programmes.
2	MAAE- 1.2	Policy Studies In Adult/Continuing Education	2020	1 Identify the socio-political movements during pre-independence period for the promotion of literacy. 2.Analyze the trends of adult education programmes during post-independence period from social education to saakshar Bharat Mission. 3.Describe the National and International organizations efforts for the promotion of literacy at various levels. 4.Ex plain the State & Central Govt policies on adult education and special reference to literacy, post-literacy and continuing education.

3	MAAE-1.3	Adult Psychology And Learning	2020	<p>1: Acquire knowledge on psychological foundations and its relevance to Adult Education and Learners.</p> <p>2: Learn classification of motives and motivation techniques to motivate the Adult Learner.</p> <p>3: Compare the Adult Personality & Child personality based on three Domain principles.</p> <p>4: Examine the Adult Learning characteristics and theories of learning, eventually he/she will apply all aspects in adult class room activity.</p>
4	MAAE-1.4	Socio-Philosophical Foundatons Of Adult Education	2020	<p>1.Create thinking capacity to survival in the present society with philosophical approach.</p> <p>2.Know great eminent leaders biography, sacrifices their lives for society.</p> <p>3.Aware Dalit movement, women movement, co-operative movement in society especially rural areas.</p> <p>4.Examine the problems of society with reference to bonded labor, child labour, untouchability, transgender and provide awareness on human rights.</p>

5	MAAE-1.5	Communication Methods in Adult Education	2020	<ol style="list-style-type: none"> 1. Remembering the concept and methods of communication and their application to adult Education 2. Identifying different models of communication. 3. Describing the media of communication and their utility in continuing education. 4. Realising the use of different Audio-visual aids in teaching learning process.
6	MAAE-1.6	Human Values And Professional Ethics-I	2020	<ol style="list-style-type: none"> 1. know the importance of professional ethics and to implement the ethical values in various professions. 2. understand about the Good and bad values and to analyze the basic moral concepts. 3. inculcate the students in the aspects of pursharthas . 4. Know different crimes and its impact on personal and social life and theories of punishment
7	MAAE-2.1	Recent Trends In Adult And Continuing Education	2020	<ol style="list-style-type: none"> 1. Identify the variations of literacy growth among States and Nation with reference to gender, rural and urban. 2. Recognize the functions, activities of JSS and Saakshar Bharat Mission, to promote Life Long learning. 3. Understand the five-year plan period programmes in terms of literacy, non-formal and functional literacy. 4. Examine the significance of the extension activities as third dimension of literacy programmes at field level.

8	MAAE-2.2	Curriculum And Methods Of Literacy Teaching	2020	<ol style="list-style-type: none"> 1. Remembering the meaning, foundations and theories of curriculum development with reference to adult learners. 2. Distinguishing different principles and approaches of curriculum development. 3. Interpreting the needs and interests of lifelong learners. 4. Executing to evaluate Adult Education programmes
9	MAAE-2.3	Research Methods In Adult Education	2020	<ol style="list-style-type: none"> 1. Understanding the concepts and methods of research. 2. Adopting the suitable sampling methods for research studies. 3. Developing tools for research studies. 4. Ability of research report writing.
10	MAAE-2.4	Field Work & Practical Assignments	2020	<ol style="list-style-type: none"> 1. Application of knowledge and skills in project designing 2. Ability to do research work. 3. Finding solutions to the problems identified in his research work. 4. Preparing the research report.

11	MAAE-2.5	Management Of Adult/Continuing Education	2020	<ol style="list-style-type: none"> 1. Know the principles of Management, Planning and Organizing capacity to conduct Adult Education Programmes. 2. Develop Social and Communication Skills to organize village, Mandal, District, State and Central level programmes. 3. Acquire project techniques for sustainable programmes. 4. Learn and enhance research skills to write project report, monitoring and evaluation of data of Adult Education Programme.
12	MAAE-2.6	Human Values And Professional Ethics-Ii	2020	<p>Understand and recognize the importance of Value Education & Human Values and also try to follow the traditional values of family, women and elders in the society.</p> <p>2: Examine code of ethics for medical and health care professionals. They Can sensitize the rural people on Health Issues & Problems.</p> <p>3: Explain the Environmental Protection and relationship between Man and Nature, causes of pollution and impact on environmental health.</p> <p>4: Recognize the need of Social ethics and fight against the anti-social activities, Organ trade, Human trafficking etc.</p>
13	MAAE-3.1	Training In Adult And Continuing Education	2020	<ol style="list-style-type: none"> 1. Identify the importance of training in Adult and Continuing Education programmes and differences between training and education. 2. Know the training methods, training

				<p>materials to organize the Adult and Continuing Education programmes.</p> <ol style="list-style-type: none"> 3. Follow the teaching methods like Lecture, discussion, demonstration and Role Play methods. 4. Recognize training facilities at different levels like National, State, District and Local.
14	MAAE-3.2	Comparative Studies In Adult Education	2020	<ol style="list-style-type: none"> 1: Compare the Adult Education Programmes of different countries based on its aims and significance. 2: Compare and contrast of Adult Education movement and progress in different countries like UK, USA, Denmark etc with reference to India. 3: Find out the similarities and dissimilarities of Adult Education Programs in selected countries. 4: Identify the problems of Adult Education in terms of Planning, Organization and Budget activities in developing countries and India.
15	MAAE-3.3	Material Development For Adult And Continuing Education	2020	<ol style="list-style-type: none"> 1. Identify the significance of learning materials in Adult Education classes. 2. Design the teaching learning activity objectives for better performance of Teacher educator in Adult Education Programmes. 3. Enhance language forms and competence and tune with the needs of the learner. 4. Develop teaching learning materials for self-

				learning
16	MAAE-3.4a	Peoples' participation And Development	2020	<ol style="list-style-type: none"> 1. Analysing the role and functions of people committees, 2. Understanding the functions of Panchayat Raj institutions. 3. Knowledge on the role of co-operatives in rural development. 4. Ability to catalyse the performance of PRIs and co-operatives.
17	MAAE-3.4b	Vocational Education And Skill Development	2020	<ol style="list-style-type: none"> 1. Identify the relationships of Vocational Education and Adults development. 2. Understand the institution training importance and its practices in vocational training. 3. Identify the issues of Rural Vocational training in India and Asian Countries. 4. Provide Vocational Guidance and Counselling for Adult trainees.
18	MAAE-3.4c	Guidance And Counselling In Adult And Continuing Education	2020	<ol style="list-style-type: none"> 1. Remembering the concept and theories and perspectives of guidance and counselling in educational process. 2. Recollecting understanding and analysis of

				<p>educational problems of a clientele group.</p> <ol style="list-style-type: none"> 3. Knowing the roles and functions of guidance counsellor. 4. Analysing the use of computers and internet in guidance and counselling.
19	MAAE-4.1	Monitoring And Evaluation	2020	<ol style="list-style-type: none"> 1. Identify the concept of monitoring and monitoring systems in adult education 2. Describe the different evaluation models. 3. Demonstrate the tools and techniques of evaluation. 4. Understand the importance of learner evaluation.
20	MAAE-4.2	Human Resource Development And Management In Lifelong Learning	2020	<ol style="list-style-type: none"> 1. Understand the importance of human resource development and its historical background. 2. Analyze the human capital and its functions in Adult Education. 3. Explain the cost benefit process and problems of measurements. 4. Identify the need of planning in human resource development and relation to Adult Education.
21	MAAE-4.3a	Environment And Education	2020	<ol style="list-style-type: none"> 1. Understand the fundamental aspects of environment and need of environmental protection. 2: Interpret the environmental crisis with reference to pollutions and its impact of human life need of

				<p>Environmental Conservation.</p> <p>3: Know the environmental laws and role of individual and community to Control environmental pollution.</p> <p>4: Explain Ecology and eco factors for Ecological Balance.</p>
22	MAAE-4.3d	Population Education	2020	<ol style="list-style-type: none"> 1. Recollecting the concepts, needs and importance of population related terminologies. 2. Analysing the causes and consequences of population growth. 3. Distinguishing the roles of different agencies in promotion of population education and control. 4. Identifying the different National population policies and influences fertility, mortality and migration.
23	MAAE-4.4	Dissertation / Project Work	2020	<ol style="list-style-type: none"> 1.Application of knowledge and skills in project designing 2.Ability to do research work. 3.Finding solutions to the problems identified in his research work. 4.Preparing the research report.

2. Ancient Indian History, Cultural Archeology

S.No	Course Code	Name of the Course	Year of introducti	Course Outcomes
1	AIHC&A-101	History of Ancient India upto 550 A.D.	2020	<p><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto 550 C.E.</p> <p><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> Student will also be well versed with different analytical approaches and models of</p>
2	AIHC&A-102	History of India from 1206 A.D. to 1526 A.D.	2020	<p><input type="checkbox"/> Students can familiarize in understanding the continuity with changes in all spheres of history and culture under the Delhi sultanates.</p> <p><input type="checkbox"/> Students can able to assess the contribution of sultanates to Indian culture and impact of Islamic institutions on Indian culture</p>

3	AIHC&A-103	History of Andhrasupto 1323 A.D.	2020	<input type="checkbox"/> <input type="checkbox"/> The study of comprehensive history of the country is incomplete without the study of regional history. <input type="checkbox"/> <input type="checkbox"/> Regional history is becoming more and more popular, for it has inherit potential of tapping varied kinds of sources for understanding the divergent aspects of local heritage and culture. <input type="checkbox"/> <input type="checkbox"/> The students can develop thorough
4	AIHC&A-104	Ancient World Civilizations.	2020	<input type="checkbox"/> <input type="checkbox"/> Students gain familiarity with the rise and characteristic features of the ancient world Civilizations, its regional extent and variation. <input type="checkbox"/> <input type="checkbox"/> Students can understand the glory of the civilizations, the nature of its cities and material remains and institutions.
5	AIHC&A-105	(A) Principles and Methods of Archaeology.	2020	<input type="checkbox"/> Students can develop a strong foundation on the basic understanding of the nature, fundamentals, development and value of archaeology as a discipline. <input type="checkbox"/> <input type="checkbox"/> Familiarized with basic descriptive technique and preliminary study of various categories of objects and the practical methods of doing
6	AIHC&A-105	(B) Advanced Archaeological Theory and Research Methodology	2020	<ul style="list-style-type: none"> ➤ The student will be able to understand the basic features of various theories and thoughts used in archaeological interpretations. ➤ They can formulate a research proposal and decide on appropriate materials and methods of analysis.

7	AIHC&A-106	Human Values and Professional Ethics-I.	2020	<p>□□□□□ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives.</p> <p>□□ They inspire the fundamental goodness of human beings and society at large.</p>
8	AIHC&A-201	History of India from 550 A.D to 1206 A.D.	2020	<p>□□ Students can develop comprehensive knowledge on political, social, economic, religious and cultural history of early medieval India , regional polities and its impact</p> <p>□□ Can also able to understand the circumstances lead to the invasions of Arabs and foundation</p>
9	AIHC&A-202	History of Medieval India from 1526 A.D to 1707 A.D.	2020	<p>□□ Students can understand thoroughly the Mughal conquest of India, their rule and legacy.</p> <p>□□ The study help the students to assess the achievements and contribution of Mughals to Indian history and culture</p>
10	AIHC&A-203	(A) History of South India from 1323 A.D. to 1724 A.D.	2020	<p>□□ This course provides comprehensive knowledge on the last imperial political formation in South India and the history of Vijayanagara, Bahmani and contemporary pretty powers.</p> <p>□□ It helps to understand with the context of</p>

11	AIHC&A-203	(B)Pre and Proto Historics in India	2020	<input type="checkbox"/> <input type="checkbox"/> Students will develop a strong foundation and critical understanding of the pre-proto cultures of India and will be able to situate Indian materials within wider archaeological debates.
12	AIHC&A-204	Historical Archeology	2020	<input type="checkbox"/> <input type="checkbox"/> The students can understand thoroughly the nature of the historical archaeology and their importance in historical and cultural studies. <input type="checkbox"/> <input type="checkbox"/> Able to interpret and writing the history with the help of written records.
13	AIHC&A-205	Human Values and Proffesional Ethics-II	2020	<input type="checkbox"/> <input type="checkbox"/> Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. <input type="checkbox"/> <input type="checkbox"/> They inspire the fundamental goodness of
14	AIHC&A-301	Epigraphy	2020	<input type="checkbox"/> <input type="checkbox"/> Students will be able to understand the profession knowledge on decipher and read scripts; assess the date of inscriptions with the help of paleographic features. <input type="checkbox"/> <input type="checkbox"/> Able to understand the different languages used in inscriptions, interpret the inscription in its Political. Socio-economic and Religious context.

15	AIHC&A-302	History of Indian Architecture	2020	<p><input type="checkbox"/> <input type="checkbox"/> Students will be able to understand the evolution of architecture in India and their transformation through the ages in their religious, regional and stylistic context.</p> <p><input type="checkbox"/> <input type="checkbox"/> Can gain theoretical knowledge about the basic philosophy, fundamental aspects and multifaceted nature of Architecture.</p>
16	AIHC&A-303	Historiography and Historical Method	2020	<p><input type="checkbox"/> <input type="checkbox"/> It provides a critical overview of one of the most dynamic areas of modern historical inquiry—global history.</p> <p><input type="checkbox"/> <input type="checkbox"/> The students can familiarize with historical studies, the theories and methods used in the practice of history writing.</p> <p><input type="checkbox"/> <input type="checkbox"/> Students also gain foundation knowledge on Historical Methods and fundamentals of</p>
17	AIHC&A-304	(A)History of Modern Andhra from 1724 AD to 1956AD	2020	<p><input type="checkbox"/> <input type="checkbox"/> The students can understand the history of Andhra as well the history of Hyderabad state under company and crown rule.</p> <p><input type="checkbox"/> <input type="checkbox"/> Assess the role of Andhras in the freedom movement</p> <p><input type="checkbox"/> <input type="checkbox"/> Acquire thorough knowledge on the causes and</p>
18	AIHC&A-304	(B)Social and Political Institutions in Ancient India	2020	<p><input type="checkbox"/> <input type="checkbox"/> Students get acquainted with various developmental phases of the Indian social institutions and their significance in human life and values</p> <p><input type="checkbox"/> <input type="checkbox"/> It helps to understand the concepts of Political institutions in Ancient India and their significance.</p>

19	AIHC&A-305	(A)Outlines of Indian History	2020	<input type="checkbox"/> <input type="checkbox"/> The non history students as an external elective course become familiar in understanding the broad phases of Indian history and culture
20	AIHC&A-401	History of Indian Art	2020	<input type="checkbox"/> <input type="checkbox"/> Students become familiar with the monuments and their sculptures, art forms, features, styles and art schools of India during the period covered in the course.
21	AIHC&A -402	Numismatics	2020	<input type="checkbox"/> <input type="checkbox"/> Students will be able to identify and decipher the coins. <input type="checkbox"/> <input type="checkbox"/> They will also be able to understand the socio-political background that accure through the coinage of that time; thus getting holistic picture of
22	AIHC&A-403	Historical Application in Tourism	2020	<input type="checkbox"/> <input type="checkbox"/> The students can familiarize the knowledge needed to excel in tourism activities. <input type="checkbox"/> <input type="checkbox"/> It will equip the students with the solid foundation to build upon the fundamentals, useful skills and expertise that can assist employment in Tourism Industry
23	AIHC&A-404	(A)Museology	2020	<input type="checkbox"/> <input type="checkbox"/> Students can learn the basic nature, functions of museums and their activities. <input type="checkbox"/> <input type="checkbox"/> The students were able to acquire the essential skills and knowledge needed for Museum profession.

24	AIHC&A-404	(B)Indias Early Cultural Contacts with other Countries	2020	<input type="checkbox"/> <input type="checkbox"/> Cross regional cultural diffusion has been an important aspect of historical evolution. A strong and vibrating civilization having its impact felt upon other contemporary cultures has been a common phenomenon of history. <input type="checkbox"/> <input type="checkbox"/> Student can understood well India's early cultural contacts and its influence in South East Asia, Central Asia, Persia, Indo China, Ceylon and
25	AIHC&A-405	(A)Introduction to Indian Archeology	2020	<input type="checkbox"/> <input type="checkbox"/> The external elective students can acquire the knowledge about the importance of archeological studies, its relevance to other sciences. <input type="checkbox"/> <input type="checkbox"/> Will become familiar to understand the

3. Area Studies Programme

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SE-101	Early Cultural History of Southeast Asia	2020	<p>The Programme on Southeast Asian and Pacific Studies (SEAPS) will enrich the students largely related to geographical, historical, political, economic, social and strategic engagement of India with the states of Southeast Asian and South Pacific countries.</p> <p>Educate the students with interdisciplinary outlook and multidisciplinary engagement on Southeast Asian region.</p>
2	SE-102	Regional Geography of	2020	Comprehensive understanding of Southeast Asian and Pacific region through multidisciplinary approach

		Southeast Asia		Educate the students with interdisciplinary outlook and multidisciplinary engagement on Southeast Asian region.
3	SE-103	Colonization of Southeast Asia	2020	Students will have adequate knowledge on rise and fall of Portuguese Students differentiate the colonial powers that ruled Southeast Asia
4	SE-104	Ancient Indian History up to 1206 A.D.	2020	Students comprehend ancient Indian History, Indus Valley Civilization, Vedic Culture and Jainism and Buddhism. Know the rise of different Dynasties and contribution to Indian Culture.
5	SE-105a	Modern European History, 1870-1991	2020	Differentiate volatile political situation in Europe Earn broad understanding of Bismarck and consolidation of the Germany.
6	SE-105b	History of Indian Constitution, 1773- 1947	2020	Students learn different stages of national movement Gain full understanding of the Mahatma Gandhi Learn the contributions and sacrifices of the various national leaders
7	SE-105c	Indian National Movements	2020	Students comprehend the importance of acts in government

				<p>Gain knowledge on the Indian Independence Act of 1935</p> <p>Know the salient features of Indian Constitution</p>
8	SE - 106a	Medieval Indian History 1206 A.D.–1707 A.D	2020	<p>Students will gain knowledge on Major dynasties of Medieval India</p> <p>Students know the great Indian rulers of Medieval period</p> <p>Students comprehend the advent of Europeans</p>
9	SE-106b	History of Asian and African Nationalism	2020	<p>Know the changing trends in Nationalist movements</p> <p>Students understand the nationalist movements in Southeast Asia</p> <p>Learn about the nationalist movements in Africa</p>
10	SE-201	Contemporary Cultural History of Southeast Asia	2020	<p>Students list the Christian Missionary activities in Southeast Asian countries.</p> <p>Knows the factors of Indian Emigration, and Chinese economic contribution in Southeast Asia.</p> <p>Comprehensive grasp over different cultures and religions in Southeast Asia</p>
11	SE-202	Modern History of China 1839-1976	2020	<p>Students know Western contacts, rebellions and reforms in China</p> <p>Advanced understanding on Sun Yat Sen, Chiang Kai-Shek and Mao Tse-Tung</p> <p>Distinguish Reconstruction and Consolidation of China and its foreign relations</p>

12	SE-203	Regional Geography of South Pacific and East Asia	2020	<p>Students identify physical setting, landforms, climate and soils of South Pacific.</p> <p>Comprehend on Australia, New Zealand, Japan and China</p> <p>Recognize the economic trends in South Pacific and East Asian nations</p>
13	SE-204	Nationalism in Southeast Asia	2020	<p>Understand causes for the rise of nationalism and movements in different Southeast Asian countries.</p> <p>Earn knowledge on the Japanese Occupation of Southeast Asia during the Second World War</p>
14	SE-205a	Modern Indian History 1757-1965	2020	<p>Students understand Indian sub-Continent and the Europeans arrival.</p> <p>Students distinguish the causes for the rise of nationalism and various phases of Independence movement.</p>
15	SE-205b	Indian Foreign Policy	2020	<p>Learn the dynamics of Indian foreign policy</p> <p>Earn broad understanding on Indian foreign relations</p> <p>Understand India in the SAARC</p>
16	SE-205c	International Organisations	2020	<p>Learn about necessity of International Organisations.</p> <p>Earn broad understanding of Bismarck and consolidation of the Germany.</p> <p>Understand global politics in the two world wars and</p>

				the cold war
17	SE-206a	History of USA from 1789 - 1900	2020	<p>Learn about American war of Independence</p> <p>Develop knowledge on the roles of Presidents of the USA</p> <p>Learn the causes for the Civil War, Abraham Lincoln and era of American Imperialism.</p>
18	SE-206a	International Relations	2020	<p>Students know the meaning, nature and scope of International Relations.</p> <p>Gain knowledge on the Cold War and New International Economic Order.</p> <p>Acquainted with the foreign policies of various countries; and learn about League of Nations and UNO.</p>
19	SE-301	Southeast Asia and World Politics	2020	<p>Students learn about the different political regimes in Southeast Asian nations.</p> <p>Comprehend on the contemporary political and economic conditions in Southeast Asian countries</p>
20	SE-302	Indochina Cambodia, Laos and Vietnam (1802-2000)	2020	<p>Students will learn early Western contacts and establishments of French protectorates over Indochina states.</p> <p>Gain knowledge on French Administration and freedom movements in Indochina.</p>
21	SE-303a	Modern History	2020	Knows Japan's militarization, Russo Japanese war and

		of Japan 1854-1975		the First World War Gain knowledge on US Occupation of Japan and Post World War-II developments and Japanese foreign relations.
22	SE-303b	East Asian Development in the Post Cold War	2020	Comprehend on the disintegration of Soviet Union and Emergence of New World Order. Ability to analyze security concerns in the post Cold War and perceptions of China, Japan and North Korea.
23	SE-303c	Indian Diaspora	2020	Know the reasons of Indian migration to Southeast Asian countries. Learn Indian migrant's socio-economic contribution to host nations.
24	SE-303c	Research Methodology	2020	Students will be able to distinguish the difference between primary and secondary source. Will be in a position to make use of various sources available for his or her research work.
25	SE-303d	Research Methodology	2020	Develop understanding on Area Studies and other disciplines. Gain knowledge on the history of certain geographical area.
26	304	Skills and approaches in Understanding	2020	Develop understanding on Area Studies and other disciplines. Gain knowledge on the history of certain geographical

		Area Studies		<p>area.</p> <p>Learn the skills of distinguishing social, economic and politics with other areas.</p>
26	SE-305a	India and the World	2020	<p>Develop understanding of Non-Aligned Policy under Jawaharlal Nehru and Indira Gandhi</p> <p>Build knowledge on India's Role in the United Nations</p>
27	SE-305b	Emerging Asia and the World	2020	<p>Develop understanding of Economic and Social Progress in Asia and also Economic crisis and Recovery of Asia</p> <p>Comprehensive grasp over Foreign Direct Investments in Asia, Rise of China and also about India's Look East Policy.</p>
28	SE-401	Regional Cooperation in Southeast Asia	2020	<p>Students learn about early organizations like ASA, SEATO and MAPHILINDO.</p> <p>Develop understanding on the evolution of ASEAN from 5 to 10 members</p> <p>Focus on the ASEAN Summit Meetings, ARF and AFTA.</p>
29	SE-402	Economic Landscape of Asia-Pacific	2020	<p>Develop an understanding of the rise of industrial economies like Singapore, Malaysia, Thailand and Indonesia.</p> <p>Comprehend of the economies of Australia and New</p>

				Zealand.
30	SE-403a	Post Cold War World Order	2020	Students gain knowledge on Globalization and Multi National Companies. Differentiate Regional and Multilateral Cooperation and the roles of ASEAN and SAARC.
31	SE-403b	Ethnicity And Social Transformation In Contemporary Southeast Asia And Australia	2020	Students understand archeology of South Pacific and settlement patterns Understand the European Colonization and Socio-Economic transformation Learn basic features of Australia, New Zealand and Fiji Societies and Multiculturalism.
32	SE-403c	Developing Blue Economy	2020	Acquainted with the Blue Economy, Marine Governance and Ocean Technologies. Gain knowledge on ports and shipping, oceanic resources and marine bio-technology. Develop an understanding on Renewable Ocean Energy and its Importance.
33	SE-403d	Energy, Environment and Sustainable Development	2020	Develop an understanding of the Types of energy sources in the world and India Learn about environment issues and emerging green technologies. Know the need of Renewable Energy, Green Energy, Bio-Diversity and eco systems.
34	SE-404	Project:	2020	

		Dissertation+Viva		<p>Explain the results of their project.</p> <p>Learn in detail on the broad knowledge of their topic</p> <p>Students leave their suggestions for the development of tourism in the country.</p>
35	SE-405a	India – Australia Relations	2020	<p>Learn about Littoral States of Indian Ocean and Complementarities between India-Australia</p> <p>Ability to analyze Political Issues and security concerns of both nations.</p>
36	SE-405b	India and the Asia - Pacific	2020	<p>Students understand major international developments happened after the Cold War</p> <p>Gain knowledge on the Indian foreign policy changes with Southeast and East Asia</p>

Tourism

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	T-101	Theoretical Concepts Of Tourism	2020	<p>Develop the ability to know the functions and obligations of different Tourism organizations</p> <p>Student will also learn about the noted international travel agencies</p>
2	T-102	Tourism Principles And Practices	2020	<p>Student will also learn about Tourism industry and its forms</p> <p>Gain knowledge on the Tourism policy models and Tourism</p>

				Organizations
3	T-103	Travel And Tourism	2020	To know the Tourism Regulations in detailed. To learn the importance of transport in Tourism Understands the importance of travel Document
4	T-104	Art, Architecture And Tourism	2020	Comprehend on the important schools of Art and Architecture evolved in India. Students will learn Evolution and developments of Indian Architecture from ancient to Modern period.
5	T-105a	Historical Perspectives Of Tourism	2020	Comprehensive grasp over the Tourism development in the Country Students also learn the Tourism policies and organizations in the country
6	T-105b	Socio-Economic Dimensions Of Tourism	2020	To comprehend on the global changes and their economic roles Gain knowledge on socio-economic development through tourism Comprehend on the environmental conservation
7	T-105c	International Tourism And Unesco Sites In	2020	Students know changing trends in International tourism and in India

		India		<p>Gain knowledge on the UNESCO Heritage sites</p> <p>Categorize important UNESCO tourism sites.</p>
8	T - 106a	Tourism Products	2020	<p>To know the concept of tourism products</p> <p>Students learn about the roles of major tourism products in India</p> <p>Identify different kinds of tourism destinations</p>
9	T-106b	Transport Management	2020	<p>Students will learn different Modes of Transport and understand transport linkages to Tourism</p> <p>Gain knowledge on the importance of manpower in Transport Business</p> <p>Comprehend the students how Transport Management is essential in Tourism.</p>
10	T-201	Tourism And Geography	2020	<p>Students will learn relationship between Geography and Tourism.</p> <p>Gain knowledge on the use of map reading and other tools</p> <p>Gain knowledge on the influence of geography on Tourism.</p>

11	T-202	Indian Cultural And Heritage Tourism	2020	<p>Understand the importance of unique Indian Heritage architecture of different religions</p> <p>Students will be in a position to distinguish between different art forms in India.</p>
12	T-203	Rural And Urban Tourism	2020	<p>To understand, analyse and evaluate the importance of Rural and Urban Tourism</p> <p>Students will be able to learn the need of infrastructure and economic benefits</p>
13	T-204	Ecotourism	2020	<p>Students will be in a position to assess the importance of Ecology in tourism sector.</p> <p>To make them realize how community based tourism is conducted</p>
14	T-205a	Health And Medical Tourism	2020	<p>Students comprehend on the various Medical Treatments available in India and strategy to attract Global medical Tourists.</p> <p>Learn the role of government and private sectors in promotion of Medical Tourism</p>
15	T-205b	Virtual And E-Tourism	2020	<p>To familiarize with digital tourism business concept.</p> <p>Students will understand emerging business models in E-tourism.</p>

				Students would have cognizance of E-business and its strategies.
16	T-205c	Airline Ticketing And Information Management	2020	Comprehend on the necessary Travel services in Air travel Student will also learn the use of gadgets and information technology in Tourism
17	T-206a	Travel Agency And Tour Operations Management	2020	Gain the skill of Itinerary preparation and Tour formulation process. Comprehend the functions of a travel agency and Rules and Regulations of the agency approval besides domestic travel operators
18	T-206b	Tour Packages And Itinerary Planning	2020	Students will gain techniques in finance management and execution of Itinerary planning familiar with the techniques and approaches for successful destinations visits.
19	T-301	Tourism Management	2020	Students Demonstrate managerial skills and to manage the Tourism environment To comprehend on the financial management based on the market environment
20	T-302	Emerging Trends In Tourism	2020	Student will also learn the Socio, Economic and Environmental impacts of tourism.

				To learn Tourism related laws, responsibilities and different acts related to tourism..
21	T-303a	Environment, Sustainable Development And Tourism	2020	Enables Students to learn the importance of environment in tourism Know about the different environmental declaration
22	T-303b	Tourism Research Methods	2020	Students will able to learn the skills of report writing and questionnaire design. Evaluate the difference between qualitative and quantitative methods
23	T-303c	Tourism And Human Resource Management	2020	Students know the Human resources policies, functions and importance. Student will also learn the skills of HRM challenges and opportunities.
24	T-303d	Conservation And Management In Tourism	2020	Students know about conservation, preservation, restoration and management Understand the role of Conservation organizations at national and international level
25	T- 304	Tourism Skills And Opportunities	2020	To demonstrate the learned skills on Tour commentary, destination interpretation and communication. Students gain knowledge on the problem solving methods like

				crisis management, Loss of documents and Law and order issues
26	T-305a	Tourism Industry In India	2020	<p>Students learn about the growing hospitality, transport industries and their activities</p> <p>Students will know the public policies in strengthening the tourism sector</p>
27	T-305b	Adventure Tourism	2020	<p>Students will learn the minimum standards to be followed in Adventure tourism in land based, water based and Aerial based activities</p> <p>Student gain knowledge on the Adventure Tourism Destinations in India and also Problems and Prospects of the sector</p>
28	T-401	Tourism Marketing	2020	<p>Students will learn about the concepts, market management in Tourism.</p> <p>To know different types of marketing strategies related to the tourism industry.</p> <p>To acquaint with the effective marketing skills for tourism industry.</p>
29	T-402	Planning And Development Of Tourism	2020	<p>Students comprehend the linkages with government and private sectors in Tourism</p> <p>Develop analytical views on policies of national governments and international bodies.</p>

30	T-403a	Tourism Entrepreneurship	2020	<p>Students will Identify various challenges and revival techniques relevant of enterprises.</p> <p>To gain knowledge on business strategies and diversifications in tourism</p>
31	T-403b	Tourism And Hospitality Management	2020	<p>Student will be in a position to distinguish between different types of accommodations in the hotel industry.</p> <p>Students will get familiar with the management techniques in the accommodation sector.</p>
32	T-403c	Understanding And Event Management	2020	<p>Students know the importance of MICE along with Event Planning, organizing and Marketing.</p> <p>Learn about customer care, marketing equipment and tools</p>
33	T-403d	Destination Planning And Marketing	2020	<p>Students know the importance resource analysis and Destination marketing</p> <p>Students comprehend on the Destination promotions</p>
34	T-404	Project: Dissertation+Viva	2020	<p>Explain the results of their project.</p> <p>Learn in detail on the broad knowledge of their topic</p> <p>Students leave their suggestions for the development of</p>

				tourism in the country.
35	T-405a	Globalization And Tourism	2020	Gain knowledge on the effects of Globalization and opportunities in Tourism Learn the skills to deal with different challenges like safety and security in the world
36	T-405b	Tourism Economics	2020	Students will learn the principles of Demand and Supply in Tourism chain Students will also understand how tourism helps to develop the global economy in general and Indian economy in particular.

4. Centre for Womens Studies

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
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1.	SVUWS 101	Introduction to Gender and Women's Studies	2020	<ul style="list-style-type: none"> • Provides unique skills and knowledge to the student's developing ability to identify women's and feminist activities and accomplishments – especially those that have conventionally been neglected -- across a variety of cultures and historical context
2.	SVUWS 102	Principles of Management with Gender Lens	2020	<ul style="list-style-type: none"> • To sharpen students' ability in acquiring the management skills required in their own lives, at home and in work place; • To understand the issues involved in the management of different organizations. • To enable the students to plan and handle difficult situations in their life and in work places
3.	SVUWS 103	Gender, Patriarchy and Society	2020	<ul style="list-style-type: none"> • Create knowledge on workplace gender and power relations. • Provide skill on distribution of power by
4.	105(a)	Environment: Gender and Livelihood	2020	<ul style="list-style-type: none"> • Content supported to create green jobs and also helps indigenous and rural communities promote tourism and eco-business in ways that protect their
5.	105(b)	Social Process and Behavioral Issues: Gender Questions	2020	<ul style="list-style-type: none"> • Learned how humans behave and interact with one another. There are many positions in these fields, each offering a unique opportunity to work closely
6.	105(c)	Education: Gender Achievements and Gaps	2020	<ul style="list-style-type: none"> • To create an awareness on the status of women's education • To appreciate the dimensions of gender education

7.	106(a)	Gender Sensitization and Training: Needs and Strategies	2020	<ul style="list-style-type: none"> To create Gender sensitivity among the students in every part of life of a human being; To impart knowledge on different methods of
8.	106(b)	Communication, Soft Skills and Etiquette	2020	<ul style="list-style-type: none"> Employability/ Skill development: Build impactful communication through proper body language
9.	202	Health and Nutrition: Gender Analysis	2020	<ul style="list-style-type: none"> To explore nutrition professionals' perspectives of employability skills, and knowledge and skills required in the NGO's and Industry to understand
10	203	NGO Management and Social Development	2020	<ul style="list-style-type: none"> NGO Management trains individuals working in bookkeeping, administration, raising money and operations in an NGO.
11	205(b)	Gender Identity and Leadership: Needs and Strategies	2020	<ul style="list-style-type: none"> Provides knowledge about social process and cultural understanding. It also develops a clear and precise conceptual clarity on gender and leadership
12	206 (a)	Human Rights with Gender Lens	2020	<ul style="list-style-type: none"> To impart the knowledge to the students on the inalienable aspects of human life viz., Human Rights and their evolution over the period of
13	206(b)	Financial Literacy and Management	2020	<ul style="list-style-type: none"> To present the underlying framework and concepts of Financial Management and Analyses in the context of changing Financial Management and
14	302	Research Methods and Statistics: Feminist Concerns	2020	<ul style="list-style-type: none"> This course equip students with a variety of different skills necessary to undertake and present feminist research at postgraduate level

15	303(a)	Capacity Building and Leadership: Gender Questions	2020	<ul style="list-style-type: none"> • Acquire skills to Coordinate and organize training courses and workshops for various functionaries of line departments and other
16	303(b)	Guidance and Counseling with Gender Perspectives	2020	<ul style="list-style-type: none"> • To provide the students with sound technical knowledge on guidance; • To develop the capacity of the students to tackle
17	303(c)	Human Resource Management : Gender Analysis	2020	<ul style="list-style-type: none"> • To provide the conceptual and theoretical knowledge on Human Resources; • To train the students in the Management of
18	303(d)	Women, Science and Technology: Gender Biases and Strategies	2020	<ul style="list-style-type: none"> • To inculcate ‘Scientific Temper’ among the students; • To understand how science and technology
19	304	Computer Applications and Software Packages	2020	<ul style="list-style-type: none"> • Apply basic skills for care and maintenance of computer and train as Professional in E-Office management.
20	305(a)	Social Values and Ethics : Gender Concerns	2020	<ul style="list-style-type: none"> • To understand the family values and ethics • To know about family structures and family dynamics
21	305(b)	Governance: Gender Issues and Challenges.	2020	<ul style="list-style-type: none"> • To impart knowledge to the students on the need for and current status of women’s participation in politics and administration;
22	401	Entrepreneurship Development: Gender Analysis	2020	<ul style="list-style-type: none"> • To provide the theoretical and conceptual knowledge on Entrepreneurship; • To provide the knowledge about the procedures

23	402	Women's Legislations – Gender Concerns	2020	<ul style="list-style-type: none"> To enable the students to understand the constitutional and legal provisions; To sensitize the society about legal rights of
24	403(a)	Participatory Learning, Methods and Extension	2020	<ul style="list-style-type: none"> To understand the changing concept of extension, objectives and functions of Extension; a To expose the students to outreach programmes
25	403(b)	Social Structure: Gender Biases and Questions	2020	<ul style="list-style-type: none"> To create awareness among the students on historical evolution of social institutions; To analyze the Social Construction and
26	403(c)	Women's Health: A Life Cycle Approach	2020	<ul style="list-style-type: none"> To acquire knowledge on physiological processes of one's own life; To create an awareness regarding proper age of
27	403(d)	Globalization: Gender Implications	2020	<ul style="list-style-type: none"> To create awareness among the students on the ongoing process of globalization; To analyze the impact of globalization on
28	405(a)	Media and Communication: Gender Concerns	2020	<ul style="list-style-type: none"> To expose the students on the Feminist Theories of Mass Communication; To create awareness among students how women
29	405(b)	Women and Work: Gender Questions	2020	<ul style="list-style-type: none"> To understand the concepts of work and work participation and workforce participation levels in India;

5. Econometrics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes

1	EMT 101	Microeconomic Theory I	2020	<ul style="list-style-type: none"> • The microeconomic theory is to analyze how individual decision-makers, both consumers and producers, behave in a variety of economic environments. • The common goal in all of these issues is to identify the incentives of the various participating agents and the trade-offs that they face. • Microeconomics is a branch of economics that studies the behavior of individuals and firms in making decisions regarding the allocation of scarce resources and the interactions among these individuals and firms. • Microeconomics shows conditions under which free markets lead to desirable allocations.
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2	EMT 102	Macroeconomic Theory I	2020	<ul style="list-style-type: none"> • Define and explain the process of calculating national income, identify its components, demonstrate circular flow of income, analyse the various income identities with government and international trade, define the concept of green accounting. • Understand Say's law of market, classical theory of employment and Keynes objection to the classical theory, demonstrate the principle of effective demand and income determination. • Explain the meaning of consumption function, relationship between APC and MPC, consumption and income, concept of multiplier and analyse the theories of absolute and relative income hypotheses. • Understand the relationship between investment and savings, demonstrate investment multiplier, and understand the meaning of MEC and MEI. CO5. Illustrate the meaning of interest, analyse the various theories of interest
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3	EMT 103	Mathematical Methods	2020	<ul style="list-style-type: none"> • Formulate mathematical models describing the dynamics of economic systems. Demonstrate the role of quantitative techniques in the field of business/industry, illustrate different types of equations, solve equations and system of equations, understand the concept of sets, illustrate and apply basic set operations. • Explain the rules for calculating derivatives, uses and application in calculating inter-relationship among total, marginal and average cost and revenue, calculate maxima, minima, elasticity, decide the optimal level of production for a firm. • Demonstrate the rules for calculating integration, describe the importance and application of integration in consumers' and producers' surpluses, total revenue and cost. • Illustrate matrix operation, minors, cofactors, use cofactor method to find inverse of a matrix, use Cramer's rule to solve systems of equations.
4	EMT 104	Practical II	2020	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 Able to find Inverse of a Matrix, System of Simultaneous Linear Equations and Cramer's Rule</p>

5	EMT 105	StatisticalMethods	2020	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis.</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 formulate Statistical Methods describing the dynamics of economic systems such as production function analysis and solve econometric analysis of underlying data use with knowledge advanced</p>
6	EMT 106	HumanValuesandProfessionalEthics-I	2020	
7	EMT 201	MicroeconomicTheoryII	2020	<p>Course Objectives: The microeconomic theory is to analyze how individual decision-makers, both consumers and producers, behave in a variety of</p>

8	EMT 202	Macroeconomic Theory II	2020	<p>CO1 The overarching goals of macroeconomics are to maximize the standard of living and achieve stable economic growth</p> <p>CO2 The goals are supported by objectives such as minimizing unemployment, increasing productivity, controlling inflation, and more.</p> <p>CO3 The macro economy of a country is affected by many forces, and as such, economic indicators are invaluable to assessing different aspects of performance.</p> <p>CO4 Meaning and Types of Inflation – Demand-Pull inflation – Cost-Push Inflation – The Phillips curve – The Inflation – Unemployment trade-off.</p> <p>CO5 Objectives of Macroeconomic policies – Objectives of Monetary policy. New-classical and Real Business cycles Theorem – Post-Keynesians</p>
9	EMT 203	Basic Econometrics	2020	<p>CO1 Adequate competency in the frontier areas of economic theory and methods.</p> <p>CO2 Formulation and estimation of a multiple regression model.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all models</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Estimation of system of equations, estimation of panel data models, generalized method of moments, discrete response models, censored regression models</p>

10	EMT 204	Practical II	2020	<p>CO1 Students can Identify Inter industrial relationships using Input-output analysis,</p> <p>CO2 analyse maximization of profits and minimization of costs can evaluate using Linear Programming,</p> <p>CO3 Analyse relationship of economic variables using simple and multiple regression models which are covered in basic Econometrics</p> <p>CO4 Able to estimate and interpret linear regression models and be able to distinguish between economic and statistical importance</p> <p>CO5 They should be able to critique reported regression results in applied academic papers and</p>
11	EMT 205	Mathematical Economics	2020	<p>CO1 Students can deal Mathematical calculation of static optimization, Application of Lagrange's method and also student can evaluate Differential Equations and with Economic Applications.</p> <p>CO2 Able to estimate and interpret Inter industrial relationships using Input-output analysis, also analyse maximization of profits and minimization of costs of the firms using Linear Programming method</p> <p>CO3 Economic Applications of Differential Equations – Dynamic Multiplier – Harrod-Domar Model.</p> <p>CO4 Homogeneous Linear Difference Equations with Constant Coefficients – Particular Solution of Non-homogeneous Linear Equations – Linear First Order and Second Order Difference Equations with constant coefficients – Cobweb Model –Market model with Stocks</p> <p>CO5 Formulation of LPP – Basic and Feasible</p>

12	EMT 206	Human Values and Professional Ethics II	2020	
13	EMT 301	<i>Indian Economy</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources. Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will be aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, Make in India etc</p> <p>CO4 Students will get benefit about various economic</p>

14	EMT 302	<i>EconomicsofInsurance</i>	2020	<p>CourseOutcomes:Attheendofthecourse, thestudentwillbeableto</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development seminars, internships, and/or a practicums in insurance and risk management.</p>
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15	EMT 303	<i>Advanced Econometrics</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Concepts of Heteroscedasticity & Multicollinearity • Possible reasons behind the presence of Heteroscedasticity & Multicollinearity. Skill to judge the reliability of estimation in case of violation of basic assumptions for the application of ordinary linear regression method.</p> <p>CO2 Concepts of Autocorrelation reasons behind the presence of Heteroscedasticity & Multicollinearity. Describe the variance/covariance matrix for the regression errors under the assumption that the errors are correlated</p> <p>CO3 Apply modern econometric methods covering time series analysis financial econometrics</p>
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16	EMT 304	<i>Computer Applications and Data Analysis</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will get basic knowledge of computers i.e., block diagram, evolution of computer, input/output devices, storing information in computer etc.</p> <p>CO2 At the end of this course student will gain. Examine spreadsheet concepts and explore the Microsoft Office Excel environment. Import and export data.</p> <p>CO3 Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas. Perform analysis tasks using Data analysis pack</p> <p>CO4 Student gained and evaluate Econometric Methods such as OLS, LPM, Logistic regression</p>
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17	EMT 305	<i>Public Finance</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Understand the sources of finance both public and private, demonstrate the role of government to correct market failures and possible advantage of public financing</p> <p>CO2 Attain the advantages and knowledge of public investments and other government expenditures. Understand the causes of growing public expenditures for various programmes and policies within and outside the country.</p> <p>CO3 Understand the possible burden, benefits and distribution of various types of taxes among various classes of people, know the general trend and impact on general welfare and arouse them to suggest good and bad tax system.</p> <p>CO4 Understand the needs of public borrowing from all possible sources to meet necessary public</p>
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18	EMT 306	<i>Financial Institutions and Markets</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Explain the broad features of Indian financial institutions with its apex banks' objectives and purview. Also understand the instruments to control credit in the country.</p> <p>CO2 Effectively narrate the kinds and components of money with its regulatory system, be aware of the functions, objectives and limitations of commercial banks.</p> <p>CO3 Identify the existence and development of non-banking financial institutions, know the important role of Mutual funds, LIC, investment companies etc., utilize and effectively participate in the development process.</p> <p>CO4 Understand the conditions of financial markets</p>
19	EMT 307	<i>Practical III</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Student will gain Examine spreadsheet. Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas.</p> <p>CO2 Perform analysis tasks using Data analysis pack using MS-Excel.</p> <p>CO3 Student gained and evaluate Econometric Methods such as OLS, LPM, Logistic regression analyse and conclude using SPSS Package</p> <p>CO4 Student will able to test of Multicollinearity, Heteroscedasticity and Autocorrelation.</p> <p>CO5 Student will able to test of Heteroscedasticity and Autocorrelation.</p>

20	EMT 308	Introduction to Econometrics	2020	<p>CO1 students will have adequate competency in the frontier areas of economic theory and methods</p> <p>CO2 Use basic econometric estimation techniques such as Ordinary Least Squares to estimate bivariate and multivariate regression models.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all model.</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Students will acquire additional specialization topics are estimation of system of equations, estimation of panel data models, generalized method of moments, discrete response models, censored regression models</p>
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21	EMT 309	Indian Economy	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources. Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will be aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, Make in India etc</p> <p>CO4 Students will get benefit about various economic</p>
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22	EMT 310	Economics of Insurance	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development seminars, internships, and/or a practicum</p>
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23	EMT 401	<i>International Trade and Finance</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Identify the basic difference between inter-regional and international trade, understand how international trade has helped countries to acquire goods at cheaper cost and explain it through the various international trade theories.</p> <p>CO2 Show the benefits of international trade in a way how nations with strong international trade have become prosperous and have the power to control world economy and how global trade can be one of the major contributors of reducing poverty.</p> <p>CO3 Explain how restrictions to international trade would limit a nation in the services and goods produced within its territories and at the same time explain that a rise in international trade is essential for the growth of globalization.</p> <p>CO4 Show the importance of maintaining equilibrium in the balance of payments and suggests suitable</p>
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24	EMT 402	<i>Environmental Economics</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Realize the importance and influence of environment on the economy including the quality of manpower. Arouse their feelings to make cleaner environment so as to achieve harmonious development.</p> <p>CO2 Understand that environmental problem is not the problem of a single country or region but a global problem/issue. Hence, policy formulation may be for all countries.</p> <p>CO3 Demonstrate the scientific management of waste materials; realize the role and importance of individuals to keep the environment clean.</p> <p>CO4 Understand the causes and victims of environmental pollution like poverty, population explosion, and over-use of resources, careless or unscientific dump/management of wastes.</p>
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25	EMT 403	<i>Applied Econometrics</i>	2020	<p>. Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Student will be able to develop a sound understanding of the core microeconomic concepts that economists use to understand the process of decision-making by an economic agent(s).</p> <p>CO2 The student should be able to apply mathematical tools and techniques to study behaviour of economic agents.</p> <p>CO3 Students will be able to identify strategic behaviour of economic agents and formulate them in a game theoretic framework.</p> <p>CO4 Student can explore Macro econometric models; Klein-Goldberger Model for USA, Agarwal, K. Krishna Murthy and N.V. A. Narasimhan Models</p>
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26	EMT 404	<i>Optimization Techniques in Economics</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Knowledge of several models will enhance the applicability of the knowledge to actual data solving and getting appropriate conclusions.</p> <p>CO2 Be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.</p> <p>CO3 This course will sharpen the quantitative skills of a student and help them understand applications of Operations research in varied fields like manufacturing, Finance, purchasing and procurement, assigning and allocation of resources for optimum result.</p> <p>CO4 Be able to design new simple models, like: CPM, PERT to improve decision –making and develop critical thinking and problem-solving skills.</p>
27	EMT 405	<i>Time Series Econometrics</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will acquire additional specialization through the Time series Econometrics Analysis.</p> <p>CO2 Skill to judge the reliability of estimation in case of Stationarity and Non-Stationarity test, Co-integration test.</p> <p>CO3 Forecasting with a single-equation linear regression model, and Forecasting with a multi-equation econometric model</p> <p>CO4 Student can evaluate Univariate Time Series</p>

28	EMT 406	<i>Practical IV Environmental Economics</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Able to get application knowledge of statistical packages like SPSS, E-Views to apply economic data.</p> <p>CO2 At the end of this course student will gain practical knowledge of Time Series Analysis by using EViews.</p> <p>CO3 Student gained and evaluate Stationarity test by using ADF Test.</p> <p>CO4 After complete this course student will be able to test of Spurious Regression, Co-integration test and Granger Causality test.</p>
29	EMT 407	Project	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Knowledge of several models will enhance the applicability of the knowledge to actual data solving and getting appropriate conclusions.</p> <p>CO2 Be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.</p> <p>CO3 This course will sharpen the quantitative skills of a student and help them understand applications of Operations research in varied fields like manufacturing, Finance, purchasing and procurement, assigning and allocation of resources for optimum result.</p> <p>CO4 Be able to design new simple models, like: CPM, PERT to improve decision-making and develop critical</p>

30	EMT 408	<i>Optimization Techniques in Economics</i>	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Knowledge of several models will enhance the applicability of the knowledge to actual data solving and getting appropriate conclusions.</p> <p>CO2 Be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.</p> <p>CO3 This course will sharpen the quantitative skills of a student and help them understand applications of Operations research in varied fields like manufacturing, Finance, purchasing and procurement, assigning and allocation of resources for optimum result.</p> <p>CO4 Be able to design new simple models, like: CPM, PERT to improve decision-making and develop critical</p>
31	EMT 409	Data Base for the Indian Economy	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Develop ideas of the basic characteristics of Indian economy, its potential on natural resources</p> <p>CO2 Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO3 Students can able to describe the knowledge or skills students should acquire by the end of a particular assignment, class, course, or program, and help students understand why that knowledge and those skills will be useful to them</p> <p>CO4 Creating new knowledge (Cognitive) Developing feelings and emotions (Affective) Enhancing physical</p>

32	EMT 410	Actuarial Statistics	2020	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 To learn and gain the knowledge about the impact of economic and social conditions in the financial sector.</p> <p>CO2 To create awareness about the financial terminology and calculations in the policy designing</p> <p>CO3 To skill development and honed by successful actuaries include an excellent business communications in sense with knowledge of finance, accounting, and economics.</p> <p>CO4 Actuaries often required keen analytical and</p>
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6. Economics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ECO-101 & 201	Micro Economics Analysis – I & II	2020	<ol style="list-style-type: none"> 1. Graduate Consulting Analyst. Graduate Recruitment Bureau. 2. Economic Consultant (Public Policy). 3. NERA Internship -Industry Research Analyst. Research Fellow. 4. Graduate Economic Consulting Internship, Economist, Customer Experience Strategy.
2	ECO-102 & 202	Macro Economics Analysis – I & II	2020	<ol style="list-style-type: none"> 1. Work for a central bank of financial institutions. 2. Work as a consultants. 3. work in banking sector.
3	ECO-103 & 203	Public economics & Federal Finance	2020	<ol style="list-style-type: none"> 1. Assistant commercial Tax Officers. 2. Industrial finance officers. 3. Bill collectors.
4	ECO-	Mathematical Methods in	2020	<ol style="list-style-type: none"> 1. Assistant Statistical officers.

	104&204	Economics – 1 and Statistical Methods in Economics		<ol style="list-style-type: none"> 2. Bossiness firm consultant. 3. Market research Analyst. 4. Financial analyst. 5. Investment manager. 6. International trade specialist.
5	ECO 105(a)	Fundamentals of Computer	2020	<ol style="list-style-type: none"> 1. Digital Assistants. 2. Office Computer operators.
6.	ECO 105(b)	Urban Economics	2020	<ol style="list-style-type: none"> 1. Senior urban economist. 2. International urban Economist. 3. Senior program Research analyst. 4. Urban environmental impact officer.
7.	ECO 105(c)	Welfare Economics	2020	<ol style="list-style-type: none"> 1. Policy maker. 2. Administrator. 3. Welfare officer in Sachivalyam. 4. Admin in Sachivalayam.
8.	ECO 106(a)	Economics of Environment	2020	<ol style="list-style-type: none"> 1. Environmental pollution officer. 2. Environmental consultants. 3. Environmental pollution planning and consultants. 4. Environmental conservation / Advocacy.
9.	ECO 106(b)	Demography	2020	<ol style="list-style-type: none"> 1. National Sample Survey officers. 2. Census Survey Officers. 3. Chief planning officers.
10.	ECO 107	Human Values and Professional Ethics -I	2020	<ol style="list-style-type: none"> 1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 2. Introduction of several Nature of values to be performed by Humans to lead a good and

				<p>Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
11	ECO 205(a)	International Trade: Theory and Policy	2020	<ol style="list-style-type: none"> 1. International trading officers. 2. Export and import Officers. 3. Shares consultants. 4. Commercial desk manager. 5. Global trade Advisory.
12	ECO 205(b)	Economics of Infrastructure	2020	<ol style="list-style-type: none"> 1. Analyst Infrastructure investment and associate. 2. Assistant director Infrastructure investment division. 3. Manager Infrastructure delivery.
13	ECO 205(c)	Introduction to Information Technology	2020	<ol style="list-style-type: none"> 1. Computer operator. 2. Programming officer. 3. Web designing. 4. Creation of application.
14	ECO 206(a)	Basic Econometrics	2020	<ol style="list-style-type: none"> 1. SAP Technology Consultant. 2. Market risk analyst.
15	ECO 206(b)	Economics of Tourism	2020	<ol style="list-style-type: none"> 1. Tourist guides. 2. Tourism development officers. 3. Adventure Guide. 4. Travel Consultants.
16	ECO 207	Human Values and Professional Ethics -II	2020	<ol style="list-style-type: none"> 1. Student will know the values of ethics in various fields including medical, social and business ethics. 2. The student will be enriched with several

				<p>aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>3. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
17	ECO 301	Economics of Growth and Development	2020	<ol style="list-style-type: none"> 1. Project Coordinator. 2. Recreation manager. 3. Programme Director. 4. Social and community manager.
18	ECO 302	Indian Economy	2020	<ol style="list-style-type: none"> 1. NSSO. 2. Economic Survey directors.
19	ECO 303 (a)	International Finance	2020	<ol style="list-style-type: none"> 1. Financial Advisors. 2. Financial officers.
20	ECO 303 (b)	Production Economics and Farm Management	2020	<ol style="list-style-type: none"> 1. Farm Development mangers. 2. Marketing consultants. 3. Dairy development coordinators.
21	ECO 303 (c)	Industrial Economics	2020	<ol style="list-style-type: none"> 1. Industrial relation officers.
22	ECO 303 (d)	Women and Economic Development	2020	<ol style="list-style-type: none"> 1. Velugu community coordinators. 2. Mandal book Keepers. 3. Assistant project managers. 4. DRDA Coordinators.
23	ECO 304	Communication and Soft Skills	2020	<ol style="list-style-type: none"> 1. Skill development coordinators. 2. Public relation officers. 3. Marketing and Advertising. 4. Media. 5. Meeting and event planning.
24	ECO 305	Andhra Pradesh Economy	2020	<ol style="list-style-type: none"> 1. NSSO.

	(a)			2. AP Economy Survey Directors
25	ECO 305 (b)	Agricultural Economics	2020	1. Agricultural officers. 2. Agricultural field officers. 3. Banking field officers. 4. Agricultural product and marketing coordinators.
26	ECO 401	Rural Development	2020	1. MGNREGA Programme officers. 2. District Coordinators. 3. Institutional building officers.
27	ECO 402	Financial Institutions and Markets	2020	1. Corporate finance. 2. Financial planning officers.
28	ECO 403 (a)	India's Economic Reforms	2020	1. Planning & Development Officers
29	ECO 403 (b)	Entrepreneurship and Skill Development	2020	1. Business consultant. 2. Research and development. 3. Recruiter. 4. Sales managers.
30	ECO 403 (c)	Labour Economics	2020	1. Labour officers. 2. Labour relations officers. 3. Labour relations assistant. 4. Construction estimators
31	ECO 403 (d)	Economics of Insurance	2020	1. Insurance Agents. 2. Loan processor. 3. Loss control officers. 4. Risk managers.
32	ECO 404	Human Resource and Sustainable Development	2020	1. Human resource assistant. 2. Benefits administrator. 3. Training manager. 4. Compensation specialist.

				5. Employee relations manager.
33	ECO 405 (a)	Human Resource Development	2020	1. Human resource recruiter. 2. Performance management and development. 3. Employees training officers. 4. Organizational development officers.
34	ECO 405 (b)	Planning in India and Indian Economy	2020	1. Municipality planning officers. 2. Planning coordinators.

7.English

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1)	101:	Poetry-I	2020	<ul style="list-style-type: none"> • An understanding of the evolution of English poetry across ages. • May inspire poetic creativity
2)	102:	Drama-I	2020	1.Perceive the nuances of performance 2.Recognize the transformation of human experiences into dramatic experiences.
3)	103:	:Fiction-I	2020	1. Aesthetic and literary merits of the novel 2. The conditions of the age and the influence

4)	104	:Prose-I	2020	<ol style="list-style-type: none"> 1. Understand the genre of essay 2. Imbibe the deeper human values implied in the essay.
5)	106:	Human Values and Professional Ethics-I	2020	<ol style="list-style-type: none"> 1. Realize the necessity of practicing Human values and Ethics in all walks of life including the profession they opt for 2. Understand Bhagwad Gita as a guide for modern
6)	201	:Poetry-II	2020	<p>Sensitizes the students on the classical and contemporary poetic ethos</p> <p>Raises student awareness on movements like Modernism, War Poetry, Women's poetry, Symbolism</p>
7)	202	:Drama-II	2020	
8)	203	:Fiction-II	2020	<ol style="list-style-type: none"> 1. The great works of major novelist of modern age 2. The ability to understand the technique of the Novel

9)	204	:Prose-II	2020	<p>After the completion of the course the students are able to</p> <ol style="list-style-type: none"> 1. Know the working mechanism of Feminism and socialism 2. Know the mind and strategies of Victorian essayists 3. Know the importance of culture in the lives of Victorian people
10)	205:	English Language Teaching	2020	<ol style="list-style-type: none"> 1. Understand the importance of language lab, teaching materials and audio-visual aids in the learning teaching of English. 2. Know to test and testing components of language tests and examinations and evaluation procedures
11)	301	: Indian English Literature-I	2020	<ol style="list-style-type: none"> 1. Understand the Indian English writings and movements associated with it in India 2. Understand the merits of Indian English writings and drawbacks if any
12)	302:	American Literature-I	2020	<ol style="list-style-type: none"> 1. An idea of English literature in America 2. Familiarity with the literary movements 3. Knowledge about concepts like Puritanism, transcendentalism, symbolism, impressionism etc

13)	303:	Literary Criticism-I	2020	<p>Equips the student with the evolution of English Literary Criticism from Aristotle to early twentieth century</p> <p>Helps students map the genealogy of Western canonical</p>
14)	304 (A) 304(B): 304 (C): 305 (D):	<p>:Comparative Literature</p> <p>Short Story</p> <p>Women's Writings</p> <p>Indian Literature in English</p>	2020	<p>1. Understand national and world literatures and the need of comparative studies in the global world.</p> <p>2. Understand the ways of comparative analysis</p> <p>OUT COMES:</p> <p>Perceives creativity as a tool of empowerment and unity amongst women.</p> <p>Understand gendered spaces in creativity and the genealogy of women's writings like Indian, African American, French etc.</p>
15)	305 (A):	Communicative English	2020	<p>.Understand the significance and importance of Communication in English in the present day world</p> <p>1. Understand communication process, the different types and barriers of communication</p>
16)	305(B):	English for Media	2020	<p>1. Understand the use of language in different situations in writing for the media</p> <p>2. Learn the oral skills necessary for media like interview skills</p>

17)	05(C):	3An Introductory Course to Literature	2020	<ul style="list-style-type: none"> 3. Understand the use of language in different situations in writing for the media 4. Learn the oral skills necessary for media like interview skills
18)	401:	Indian English Literature-II	2020	<ul style="list-style-type: none"> 1. Understand the Indian English writings and movements associated with it in India 2. Understand the poetic features of Indian English poetry
19)	404(A): 404(B): 404(C): 404(D):	Translation: Theory and Practice Subaltern Studies Post-Colonial Literatures World Classics in English Translations	2020	<ul style="list-style-type: none"> 1. Know the concepts of dalitism, feminism, marginalism and Subaltern aspects with relevant theories 2. Appreciate and understand the struggles and sorrows of subalterns
20)	405(A): 405(B): 405(C):	Soft Skills Indian Literature in English Translation Contemporary Translation Studies	2020	<ul style="list-style-type: none"> 1. Will learn about morals and responsibilities 2. Learn to acquire the enduring values embedded in the great literary works of our writers

11. Linguistics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	LING:101	Phonetics	2020	<ol style="list-style-type: none">1. Understand the process of Communication and speech production, Classification and four procedures of speech production.2. Analyze production of consonants and vowels.3. Understand expressing secondary and double articulations and prosodic features.
2	LING:102	Phonology	2020	<ol style="list-style-type: none">1. Understand concept of Phoneme, Principals of Phonemic analysis and discovery procedures.2 .Analyze phonemes, Phonological systems and procedures of phonemics.3. Analyze basic units of Phonology and concept of redundancy.
3	LING:103	Morphology	2020	<ol style="list-style-type: none">1. Analyze Morpheme, classification and types of morphemes2. Analyze derivation, inflection, different models of grammatical description and Morpho-

				Phonemics 3. Express Intermediate constituents, types of constructions and Idioms
4	LING:104	Syntax	2020	1. Understand assumptions about language, components of grammar and sentence constituents 2. Analyze Phase structure rules, X-bar Notation and grammatical transformations 3. Understand categorical, sub-categorical information and selectional restrictions
5	LING:105	(A)Language & Linguistics	2020	1. Understand notions of language and Approaches to the study of languages 2. Analyze structure of language and grammatical analysis. 3. Understand Linguistics and other fields .
6	LING:105	(B)Semantics	2020	1. Understand Nature and Scope of Semantics and types of meaning 2. Analyze lexical structure and Meaning and sentence structure and meaning 3. Understand Lexical context of Meaning and Theories of Meaning
7	LING:105	(C)Structure of	2020	1. Understand characteristics of

		Language (Telugu/English)		language(Telugu/English) 2. Understand Phonology and Morpho- phonemics in language(Telugu/English) 3. Understand Morphology and Syntax of language (Telugu/English)
8	LING:106	(A)Human Relations	2020	1. .To understand the introduction of Human Relations 2. 2. To Analyze factors effecting Human Relations and Human Relations Skills 3. 3. To understand Human Relations theory of management and industrial relations.
9	LING:106	(B)Insructional Technology	2020	1.Understand introduction of IT and types of IT in class room 2. Analyze IT in Teaching and Learning and improvement of IT learning process 3.Understand IT in Educational Platforms
10	LING:107	Human Values & Professional Ethics I	2020	1.Understand Ethics and its relation and Ethical values. 2.Understand Nature of values and individual Society 3.Understand Bhagavad Gita, Buddhism, Jainism etc., and crime and theories of punishment
11	LING:201	Historical Linguistics	2020	1. Understand the major breakthroughs in historical Linguistics

				<p>2. Understand sound change ,Linguistics change and Semantic change</p> <p>3. Analyses Internal reconstruction ,comparative method and Glottochronology</p>
12	LING:202	Dialectology	2020	<p>1. Understand the terms of Dialectology, history and development of dialect studies</p> <p>2. Analyze types of dialects and variability</p> <p>3. Understand dialect survey methodology and its approaches</p>
13	LING:203	Field Linguistics	2020	<p>1. Understand scope and purpose of field linguistics and problems of investigating non- literary languages</p> <p>2. Understand techniques and methods of elicitation and collection of Linguistic data</p> <p>3. Analyze the collection, recording and processing of data.</p>
14	LING:204	Language Families of India and Comparative Dravidian	2020	<p>1.Understand language families of India</p> <p>2.Aanalyze Dravidian Language Family and history and sources of each Dravidian Language.</p> <p>3.Analyze vocalic, consonant and Sandhi systems, and reconstruction of Dravidian.</p>

15	LING:205	(A)Language Contact	2020	<ol style="list-style-type: none"> 1. Analyze speech as social interaction and Interference 2. Analyze Indian language contact situation and effects of language contact 3. Understand Linguistic borrowing
16	LING:205	(B)Natural Language Processing	2020	<ol style="list-style-type: none"> 1. Understand rationalist and empiricist approaches to language. 2. Analyze Mathematical Foundations, essential information theory and Entropy. 3. Analyze Tagging, Taggers, probabilistic parsing and clustering.
17	LING:205	(C)Endangered Languages	2020	<ol style="list-style-type: none"> 1.Understand scope of Endangered Language 2.Understand reasons for Endangerment of languages and effects of Endangerment 3.Analyze criteria and Endangered Languages of India
18	LING:206	(A)Literacy, Language Curriculum Testing	2020	<ol style="list-style-type: none"> 1.Analyze literacy as communication skill 2.Understand language acquisition and survey of language learning theories of 3.Understand material for adult literacy and language testing
19	LING:206	(B)Communication Technology	2020	<ol style="list-style-type: none"> 1.Analyze communication theory and Linguistic communication 2.Understand Artificial Intelligence,

				Machine Translation and Micro planner artificial languages 3. Analyze corpus based approach, Natural Language Processing and technological advances in Communication.
20	LING:207	Human Values & Professional Ethics II	2020	1.Understand value education and human values 2.Understand effectiveness to capability Medical and Business Ethics 2.Understand environmental and social ethics
21	LING:301	Language Acquisition & Child Language Development	2020	1. Analyze language acquisition device and stages of language acquisition 2. Understand continuity and discontinuity approaches 3. Analyze the acquisition process and acquisition VS learning
22	LING:302	Language Disorders and Speech Pathology	2020	1.Understand disordered communication, language and the brain 2.Understand articulation, language and hearing disorders 3.Understand speech pathology
23	LING:303	(A)Socio Linguistics	2020	1.Analyze language and society, Linguistic variability and language varieties 2. Analyze Sociology of language planning and Language and Social identity

				3. Understand Sociolinguistic Methodology
24	LING:303	(B)Psycho Linguistics	2020	<ol style="list-style-type: none"> 1. Understand an overview of Psycholinguistics 2. Analyze speech production, perception, and comprehension. 3. Understand lexical processing , concept of meaning, bilingualism and language acquisition in children
25	LING:303	(C)Neuro Linguistics	2020	<ol style="list-style-type: none"> 1.Understand of anatomy of brain and language and speech 2.Understand History of Neuro-linguistics 3.Analyze speech and language disorders and testing techniques
26	LING:303	(D)Computational Linguistics	2020	<ol style="list-style-type: none"> 1.Understand Computational Phonetics , Phonemics, Morphology and Syntax 2. Understand computational semantics and Lexicography 3.Analyze application of computational linguistics
27	LING:304	ICT for Enriching Teaching and Learning Skills	2020	<ol style="list-style-type: none"> 1.Understand the concepts, importance and scope of ICT 2. Analyze computer networking and ICT enriched teaching & learning experiences. 3. Understand online teaching and learning experiences.

28	LING:305	(A)Bilingualism	2020	<ol style="list-style-type: none"> 1.Understand speech as social interaction 2.Analyze theory, types and Measurement of Bilingualism 3.Understand Bilingual Education and Bilingualism and ethnocentrism
29	LING:305	(B)Mass Media Communication	2020	<ol style="list-style-type: none"> 1.Understand nature, Scope and Types of communication 2.Analyze communication process and models of communication 3.Understand theory of communication and Multimedia Technology
30	LING:401	Language Universals & Linguistic Typology	2020	<ol style="list-style-type: none"> 1.Aanalyze language universals and its role of universals in linguistic theory. 2. Understand linguistic typology as a principle of classification. 3.Analyze language families of South Asia, South Asia as a Linguistic area and selected areal features of South Indian languages.
31	LING:402	Research Methodology	2020	<ol style="list-style-type: none"> 1.Understand purpose, scope, methods and tools of research 2.Understand problem identification, methods of study and scientific methods in field work of research 3.Analyze research work convert to PDF
32	LING:403	(A)Lexicography	2020	<ol style="list-style-type: none"> 1. Understand lexicology and

				<p>lexicography, notation and format, planning and organization.</p> <p>2. Analyze types, number and size of dictionaries.</p> <p>3. Understand dictionary making</p>
33	LING:403	(B)Language Teaching	2020	<p>1. Analyze role of Linguistics in language teaching and Methods of language teaching.</p> <p>2. Analyze language acquisition and second language learning and cognitive models of language learning/teaching.</p> <p>3. Understand teaching aids, remedial teaching material and computer aide language teaching</p>
34	LING:403	(C)Language Planning	2020	<p>1. Understand Nature and Scope of language planning and communication technology</p> <p>2. Analyze process and problems of language planning</p> <p>3. Understand types and treatment of language planning</p>
35	LING:404	(D)Translation	2020	<p>1. Understand the concept of translation</p> <p>2. Understand principles and analysis of translation</p> <p>3. Solve the exercises of translation</p>
36	LING:404	Multy-disciplinary Capacity Building	2020	<p>1. Understand Health and Environmental and Social Safety</p>

				Studies 2. Analyze Physical and Health Education Studies 3. Understand Work Experience and Art Education
37	LING:405	(A) Branches of Linguistics	2020	1. Analyze Language and Linguistics, branches of Linguistics, speech organs. 2. Understand Phonology, Morphology, Syntax, and semantics. 3. Understand types of Interdisciplinary Linguistics and Branches of Applied Linguistic
38	LING:405	(B) Dictionary Making	2020	1. Understand types of dictionaries 2. Analyze Monolingual Dictionary Making 3. Analyze Bilingual Dictionary Making.

12. Hindi

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Sahitya ka Itihas	2020	1. The tradition of writing history of Hindi literature along with determining the time division of Hindi literature will get the knowledge of the background of the particular period of literature. 2. The origin and traditional development

				<p>of the Bhakti literature and its trends and movements of particular period.</p> <p>3. The development of ancient literary traditions in medieval poetry in the level of language, expressions and human kindness.</p> <p>4. The form of devotional literature and achievement of the writers and philosophers in the Bhakti movements at national level.</p>
2	102	Pracheen Evam Madhya Kaleen Kavya	2020	<p>1. Student will get information about ancient literature with especial study of Chandbardai, Vidyapati and Ameer Khusro.</p> <p>2. Student will get the knowledge of the poetry of Kabeer, Tulasi, Jaysi and Surdash in medieval Hindi literature under the background of Bhakti movement.</p> <p>3. Student will get the knowledge of the poetry of Bihari and Ghananand in Post medieval Hindi literature.</p> <p>4. Overall the student will get knowledge of ancient and medieval literature in the practical study with their social and philosophical era.</p>
3	103	Aadunik Kavita	2020	<p>1. Student will know the reflexion of independent movement and renaissance</p>

				<p>of Indian society in modern poetry.</p> <p>2. Student will be able to get knowledge of their characteristics by knowing the essence of the poems of pre independent poets.</p> <p>3. Student will know the subject, theme, characters, literary forms along with the development of Khari boli as the language of poetry.</p> <p>4. Knowing the movement of romanticism in Hindi literature, theme of the poetry, love of the nature, feeling of the mankind and society in their poems.</p>
4	104	Samkaleen Kavitha	2020	<p>1. Knowledge of the poems of progressive, experimental, new and contemporary trends of poetry in Hindi.</p> <p>2. Student will get the meaning of the poems of different poets and their poetry, especial context to modern period.</p> <p>3. Student will get the knowledge of new trends of Hindi poems and its issues express by the poets in different manner to understand their present time.</p> <p>4. Student will understand the contemporary poems, its subjects, characters, ideology,</p>

				their activities, reflections and reactions.
5	105	(A) Samsamyik Kavita	2020	<p>1. Knowledge of the poems of contemporary trends-progressive, experimental, new and contemporary trends of poetry in Hindi.</p> <p>2. Student will get the meaning of the poems of different poets and their poetry, especial context to contemporary period.</p> <p>3. Student will get the knowledge of new trends of Hindi poems and its issues express by Femanist, Dalit and Tribble poets in different manner to understand their present time.</p> <p>4. Student will understand the contemporary poems, its subjects, characters, ideology, their activities, reflections and reactions.</p>
6	105	(B) Sahityik Andolan	2020	<p>1. Student will get knowledge of Bhakti movement of medieval period in arts, culture and literature.</p> <p>2. Student will understand independent, romantic movement and its reflection in literature.</p> <p>3. Student will be able to get knowledge of progressive and janvadi movement in Hindi literature.</p>

				4. Student will be get knowledge of Dalit, Tribal and Feminist movement in Indian society for democratic right to reformation and get equality in Indian society.
7	105	(C) Sahitya Ki Vaichariki	2020	<p>1. Student will know the litrary traditions and modernity, renecienss and indipendent movement along with philosophy in Hindi literature.,</p> <p>2. Renecienss in Indian society especial reference to Hindi speaking states and development of khariboli in Bhartenduyuga and Divediyuga.</p> <p>3. Knowledge of various theories to understand the medievality and modernity, critical theory of history of literature and knowledge of historical materialistic development of philosophy.</p> <p>4. Student will get knowledge of organic evolutionary philosophy with different ideologies to understand constitutional rights, democracy, socilism, Gandhism Ambekarism and feminism in Hindi literature.</p>
8	106	(A) BhashaVignan aur Hindi Bhasha	2020	1. They will acquire the knowledge of definitions, types, divisions and braches of linguistics; understand the history of

				<p>Indo-Aryan languages with origin and development of Hindi language.</p> <p>2. They know the background of development of linguistics and languages-like sociological, psychological, historical, cultural and ideological along with classification of Hindi sounds and knowledge of Hindi vocabulary.</p> <p>3. They will know the importance of language as communication source; understand the meanings, form and syntax, development of Hindi Pronouns and Devanagari script.</p> <p>4. They will understand the meaning of phonetics, directions of sound, nature of morphology, phonology and philosophy of language.</p>
9	106	(B) Patrakarita aur Jansanchar Madhyayam	2020	<p>1. They will get knowledge of the beginning of journalism and cultural development of Hindi journalism along with nature of mass media and the development of electronic media.</p> <p>2. Student will get the knowledge of independent journalism, genres of writing,</p>

				<p>concept of news and telecommunication, revolution of mechanical communication.</p> <p>3. They will know the general principles of editing, writing skills of journalism, fundamental rights and knowledge of electronic media.</p> <p>4. They will understand the working methods of mass media, development and importance of internet in world media in present scenario.</p>
10	107	Human values and Professional Ethics-I	2020	<p>1. Student will get knowledge nature of ethics and nature of values.</p> <p>2. Student gaining knowledge of the ahimsa, satya, brahamacharya.</p> <p>3. Student will get knowledge about Bhagvad Gita and Buddhism.</p> <p>4. Gaining knowledge of the crime and theories of punishment.</p>
11	201	Adhunik Sahitya Ka Itihas	2020	<p>1. There will get knowledge of various conditions of independent and renaissance era and the development of Hindi romanticism.</p> <p>2. Student will get knowledge of various trends of romanticism, progressivism and post colonial development of Hindi prose and its trends.</p> <p>3. Student will get knowledge of pre and post independent trends of poetry and</p>

				<p>prose like novel, stories, dramas, one act plays, essays and criticism in modern Hindi literature.</p> <p>4. Student will get knowledge with the development of traditions in modern era and their atmosphere, time, condition and directions in Hindi literature.</p>
12	202	Katha Sahitya	2020	<p>1. Student will be able to understand the Indian society by reading the major novel of Hindi.</p> <p>2. Student will be able to understand the various dimensions of human life depicted in the short stories of Hindi.</p> <p>3. Students will be able to know the socio-political, cultural problems and goodness by reading the characters depicted in Hindi short stories.</p> <p>4. Knowledge of socio-historical political background by reading the major characters of novels and short stories in Hindi.</p>
13	203	Natya Sahitya	2020	<p>1. Student will be able to understand the Indian society by reading the major play of</p>

				<p>Hindi.</p> <p>2. Student will be able to understand the various dimensions of human life depicted in the one act play of Hindi.</p> <p>3. Students will be able to know the socio-political, cultural problems and goodness by reading the characters depicted in Hindi one-act play.</p> <p>4. Knowledge of socio-historical political background by reading the major characters of drama and one act play in Hindi.</p>
14	204	Aalochana Sahitya	2020	<p>1. Knowledge of criticism of Hindi, its traditional base of development.</p> <p>2. Knowledge of criticism, its trends, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of criticism of Hindi writers, their trends, philosophical, critical and theoretical development in practical criticism and its values implemented by different critics.</p> <p>4. Importance of major critical trends and their critics, writing of criticism and their contribution in development of Hindi criticism.</p>

15	205	(A) Gadhya Sahitya	2020	<ol style="list-style-type: none"> 1. Knowledge of essays, autobiography of Hindi and its traditional base of development. 2. Knowledge of essays, autobiography and its trends, philosophical background, ideological development and historical process. 3. Knowledge of essays, autobiography of Hindi writers and their trends, philosophical, theoretical development of essays, autobiography and its values implemented by different writers. 4. Importance of essays, major autobiography, trends and contribution of their writers in development of Hindi essays and autobiography.
16	205	(B) Anya Gadhya Sahitya	2020	<ol style="list-style-type: none"> 1. Knowledge of Hindi prose and its traditional base of development. 2. Importance of prose, its trend, philosophical background, ideological development and historical process. 3. Knowledge of Hindi prose writers, their trends, philosophical and theoretical development of prose and its values implemented by different writers. 4. Importance of major prose trends, their writers, writing of prose and their

				contribution in development of Hindi prose.
17	205	(C) Andhra ka Hindi Sahitya	2020	<ol style="list-style-type: none"> 1. The tradition of writing Hindi literature by Hindi writers of Andhra along with determining the time division of Hindi literature and background of the periodical literature. 2. The origin and traditional development of Hindi literature by Hindi writers of Andhra and its trends. 3. The development of Hindi literature writern by Hindi writers of Andhra, literary traditions in poetry and prose, development of Hindi language, expressions and human kindness by their writing in Hindi. 4. The form and achievement of the writings, philosophical, socialogical and pshycological background of their literature and contribution in national level.
18	206	(A) Proyajan Mulak Hindi aur Rajbhasha	2020	<ol style="list-style-type: none"> 1. Knowledge of the various trends of Functional Hindi, Rajbhasha Hindi and its constitutional importance. 2. Knowledge of key elements of Functional Hindi and correspondence language

				<p>of central and state government official work.</p> <p>3. Student will get knowledge of correspondence and its types, official mailing, drafting, noting, corresponding types and its various forms in Functional Hindi.</p> <p>4. Student will get knowledge of official language Hindi, personal administrative, and finance and public relations management in Hindi language, utility of Hindi language in official level, letter writing and using of technical vocabulary.</p>
19	206	(B) Anuvad ke Sidhanth aur Prayog	2020	<p>1. Student will get to know of the form, process and methods of translation.</p> <p>2. Student will gain the knowledge of types of translation as well as problems of translation.</p> <p>3. Student will acquire the knowledge of translation tools and various branches of translation.</p> <p>4. Student will know the principle of construction, nature and importance of translation in practical.</p>
20	207	Human Values and Professional Ethics-II	2020	<p>1. Student will get knowledge of value education and medical ethics.</p> <p>2. Student will get knowledge of the business and environment ethics.</p>

				3. Gaining knowledge of the social ethics.
21	301	Bhartiya Kavya Shastra Ki Parampara	2020	<p>1. Knowledge of the Achary tradition of Sanskrit poetics and the main principles of poetry soul.</p> <p>2. Student will be familiar with the poetic theory of Sanskrit, Pali, Prakrit, Apabramsha and Hindi with their ideological trends of modern literary personalities.</p> <p>3. Knowledge of ideological thinking of poetry, as principals of poetics in ancient, medieval and modern period of post independence era.</p> <p>4. Knowledge of writings of poetics by Acharyas, poets in ancient and medieval period.</p>
22	302	Hindi Kavya Shastra Ka Vikash	2020	<p>1. Student will get knowledge of thinking of modern writers, about the creativity, its aspects, responsibilities of writers, values of writing.</p> <p>2. Student will known the contribution of writing and justification of creativities etc., by development of theoretical criticism in the base of modern ideological and philosophical.</p> <p>3. Student will get knowledge of poetic developed by great Acharyas of Hindi by</p>

				<p>their writings and ideological conceptual development of modern poetics.</p> <p>4. Student will be able to know the poetic development of pre independent and post colonial period ie romantic poets, thinkers, prograssive writers, contemporary poets and literary personalities.</p>
23	303	(A) Dalit Sahitya	2020	<p>1. Student will get to know the concept of dalit literature and literary movements, with philosophical base and its consciousness.</p> <p>2. Student will get knowledge with the characteristics of dalit literature, ideological strength and philosophical power.</p> <p>3. Student will get knowledge of traditional concept of dalit literature and the problems writing its own history.</p> <p>4. Student will get knowledge of dalit literature in different form, its writers and literary trends like novel, short stories drama, one act play and autobiography etc.</p>
24	303	(B) Adivasi Sahitya	2020	<p>1. Student will get knowledge with the concept of tribble literature and literary movements, philosophical base of tribble literature and its consciousness.</p>

				<p>2. Student will get knowledge with the characteristics of tribble literature i.e ideological strength and philosophical power.</p> <p>3. Student will get knowledge of traditional concept of tribble literature and the problems writing its own history.</p> <p>4. Student will get knowledge of tribble literature in different form, its writers and literary trends like novel, short stories drama, one act play and autobiography etc.</p>
25	303	(C) Narivadi Sahitya	2020	<p>1. Student will get the knowledge of nature of feminist thoughts and writings in Hindi.</p> <p>2. Student will get the knowledge of the various dimensions of feminist thoughts in Hindi.</p> <p>3. Student will get the knowledge of the position and direction of female personalities.</p> <p>4. Student will get an opportunity to understand the literature like poetry, prose, short stories, novels and autobiography of feminist writers.</p>
26	303	(D) Pravasi Sahitya	2020	<p>1. Student will get the knowledge of</p>

				<p>nature of NRI thoughts and writing skill in Hindi</p> <p>2. Student will get the knowledge of the various dimensions of NRI thought in Hindi.</p> <p>3. Student will get the knowledge of the position and direction of NRI personalities.</p> <p>4. Student will get an opportunity to understand the literature like poetry, prose, short stories, novels and autobiography of NRI writings in Hindi.</p>
27	304	Bhash Shikshan ke Sidhanta aur Proyog	2020	<p>1. Student will get the knowledge of forms, process and methods of language teaching.</p> <p>2. Student will gain the knowledge of types of language teaching as well as problems of the same.</p> <p>3. Student will acquire the knowledge of language teaching, tools and various branches of language teaching.</p> <p>4. Student will know the principle of construction, nature and importance of language teaching in practical.</p>
28	305	(A) Vyavaharik Hindi	2020	<p>1. Student will get the knowledge of</p>

		Vyakaram		<p>nature and word wealth of Hindi language.</p> <p>2. Student will get the knowledge of the Devanagari scriupt, sound, vowels and consonants.</p> <p>3. Student will gain knowledge of the Hindi sentence, gender, words, factor and meaning of Hindi tenses.</p>
29	305	(B) Hindi Sahitya Ke Nirmatha	2020	<p>1. Student will get the knowledge of Ameer Khusro, Vidhayapati, Kabir, and Jayasi.</p> <p>2. Student will learn about the medieval poets-Sur, Tulsi, Meera, Raskhan, Rahim, Bihari and importance of their poetries.</p> <p>3. Student will be able to get the knowledge of ancient and medieval poets and poetry, especial reference to Bhakti movement.</p> <p>4. Student will be able to get information regarding literary trends, developed in pre modern period.</p>
30	401	Bharatiya Tulnatmak Sahitya	2020	<p>1. Student will get information about the comparative Indian literature, its concept and form of Indian literature and various stages of development.</p> <p>2. Student will able to understand the problem of writing, devotional consciousness of comparative Indian literature with</p>

				<p>cultural features and influencing thoughts.</p> <p>3. Knowledge of national independence movements, renaissance, romanticism, realism, progressivism and post colonial realistic consciousness reflected in comparative Indian literature.</p> <p>4. In comparative Indian literature, the knowledge of democratic values, subaltern studies with their philosophy, movement of social reformation and identity in literature.</p>
31	402	Paschatya Samiksha Shashtra	2020	<p>1. Student will get the knowledge of Plato's pre period and introduction to Greek thinkers.</p> <p>2. Student will get the knowledge of western criticism from Plato to post modernist period.</p> <p>3. Student will get an introduction to all types of modern literary critical theories and thinkers.</p> <p>4. Student will get the knowledge of historical, philosophical development of western criticism by the different thinkers of various fields of knowledge and</p>

				disciplines.
32	403	(A) Anudit Bhartiya Sahitya	2020	<p>1. Student will get the information about translated Indian literature, its concept, form of Indian literature and various stages of development.</p> <p>2. Student will be able to understand the problem of writing, devotional consciousness of translated Indian literature with cultural features and influencing thoughts.</p> <p>3. Knowledge of national independent movements, renaissance, romanticism, realism, progressivism and post colonial realistic consciousness reflected in translated Indian literature.</p> <p>4. In translated Indian literature the knowledge of democratic values, subaltern studies, their philosophy, movement for social reformation and identity in literature.</p>
33	403	(B) Asmitamulak Sahitya Vimarsha	2020	<p>1. Knowledge of contemporary criticism of dalit, femanist and tribble literary trends.</p> <p>2. Knowledge of contemporary criticism, its tread, philosophical background, ideological development and historical process.</p>

				<p>3. Knowledge of contemporary criticism of Hindi writers, their trends, philosophical and critical theoretical development, practical criticism and its values implemented by different critics.</p> <p>4. Knowledge of major critical trends, their critics, writing of criticism and their contribution in development of contemporary criticism. 1. Knowledge of contemporary criticism of dalit, femanist and tribble literary trends.</p> <p>2. Knowledge of contemporary criticism, its tread, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of contemporary criticism of Hindi writers, their trends, philosophical and critical theoretical development, practical criticism and its values implemented by different critics.</p> <p>4. Knowledge of major critical trends, their critics, writing of criticism and their contribution in development of contemporary criticism.</p>
34	403	(C) Sahitya ka	2020	1. Student will get the knowledge of study

		Tulanathmak Adhyayan		<p>of comparative literature with different methods, nature and problem of comparative literature and studies.</p> <p>2. Student will be able to know the study of comparative literature, research work and the role of translation etc.</p> <p>3. Student will gain the knowledge of comparative study of Hindi-Telugu literature.</p> <p>4. Student will get the knowledge of Hindi and Telugu literary trends and types of literature like novel, short stories, dramas, essays and subaltern studies of literature.</p>
35	403	(D) Anusandhan Ke Siddhanth aur Dristiya	2020	<p>1. Student will get the knowledge of nature, directions, types and methods of research like sociological, regional, textual, linguistic, poetics, comparative and psychological.</p> <p>2. Student will know the methods of selecting topic, collection of material, preparing of notes, writing and arrangement of thesis.</p> <p>3. Student will get the knowledge of interview, preparing of short notes, using of</p>

				<p>library, methods of preparing the notes, modification of thesis, editing, presenting, and writing of conclusion.</p> <p>4. Student will be able to know the using of critical theories in research of literature, logistical, linguist problems of research and searching the solutions in research.</p>
36	404	Antar Jananushasnatmak Drushtiya aur Pravidhiya	2020	<p>1. Student will know the poetics, spiritual, mythological, materialist, realist, romantics and views of study of literature.</p> <p>2. Student will be able to get Knowledge of sociological, historical, aesthetical and psychological vision of literature.</p> <p>3. Students will know about the new critical, modernist and post modernist, structural and post structural view of literature.</p> <p>4. Student will understand the linguistics, stylistics, comparative, democratic, Ambedkarist, feministic, colonial and post colonial, Gandhian and humanitarian view of literature.</p>
37	405	(A) Manak Hindi Aur Devnagari Lipi	2020	<p>1. Student will get the knowledge of Hindi forms, designs, vocabulary and sound composition and spelling problem.</p>

				<p>2. Student will get the knowledge of formation of terminology, to know the development and use of Devnagari script in practice.</p> <p>3. Student will know about the standard of Hindi, relation with grammar, use of Hindi language in oral and writing both levels.</p>
38	405	(B) Adhunik Hindi Sahitya Ke Nirmata	2020	<p>1. Student will get the knowledge of the writer of modern Hindi.</p> <p>2. Student will get the knowledge of the Hindi writers and their writings.</p> <p>3. Student will be able to know about different trends of literature with writers.</p>

13. History

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
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1	History 101	HISTORY OF INDIA UPTO 650 A D	2020	<p>1.Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto 650 C.E.</p> <p>2.Student will also be well versed with different analytical approaches and models</p>
2	History 102.	: History of Indian Polity and Economy, 1206-1757	2020	<p>1. Discuss Indus Valley and Vedic Civilization</p> <p>2. Students will understand Polity and economy from the Mauryas to Pallavas</p> <p>3. Discuss Guptas, Chalukvas, Vakatakas.</p>
3	History 103	History of Modern India, 1757-1947	2020	<p>1. Discuss World between two World Wars pertaining to League of Nations, Great Depression, Nazism, and Fascism.</p> <p>2. Students will understand International Relations during 1919-39</p>
4	History 104	History of Modern World, 1900-1945	2020	<p>1.Student can gain the knowledge on the history and consequences of the World between two World Wars pertaining to League of Nations, Great Depression, Nazism, and Fascism.</p> <p>2.Students will understand International Relations during 1919-39.</p>
5	History 105	History of Andhras, Up to 1336 AD	2020	<p>1. Discuss Nature and Scope of Tourism</p> <p>2. Will understand Elements of Tourism</p> <p>3. Discuss Tourism Organization and Promotion</p>

6	History 106a	Theoretical Concepts of Tourism	2020	<p>1.The students can gain fair understanding about the fundamentals of tourism and its basic concepts.</p> <p>2.The students can acquire professional knowledge to get opportunity in tourism industry</p>
7	History 401	Historiography	2020	<p>1.It provides a critical overview of one of the most dynamic areas of modern historical inquiry—global history.</p> <p>2.The students can familiarize with historical studies, approaches theories and methods used in the practice of history writing</p>
8	History 402	Contemporary History Of India - II	2020	<p>1.Students were able to understand the Functioning of Parliamentary Democracy in India</p> <p>2.Acquire knowledge on Emergency and its Aftermath</p> <p>3.Able to assess the significance of Economic</p>
9	History 403a	International Relations And Organizations	2020	<p>1.Students can possess knowledge on the Concept of International Relations</p> <p>2.Were able to understand Balance of Power</p> <p>3.Can gain knowledge on International Organizations</p>
10	History 403b	Constitutional History of India, 1773-1950	2020	<p>1.The course helps the students to gain require knowledge on the enactment of various acts introduced by the British</p> <p>2.Students will also understand the impact of the legislations, National Agitations and its Prospective.</p>

11	History 403c	History of Modern Asia 1868-1960	2020	1.Students can possess knowledge on Japanese Imperialism. 2.Will understand Emergence of Modern Korea and Modern West Asia
12	History 403d	History of Modern Latin America	2020	1.Students will be identify struggles for Independence in Latin America 2.They will understand the politics of the Western Powers in Latin America..
13	History 404	History Of Science And Technology In India 1858- 1947	2020	1.This paper will make the students to understand how far Science and Technology has progressed in India and resulted in bringing Socio-Economic changes in the Society.
14	History 405a	Outlines of Andhra History and Culture	2020	1.The study of comprehensive history of the country is incomplete without the study of regional history.The external discipline students can develop thorough understanding
15	History 405b	Health, Medicine And Society In Modern India	2020	1.Possess knowledge and awareness about the Public health 2.Able to understand the Western and Indigenou Medical systems.

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Human Rights and Duties

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	HR – 101	Human Rights: Concepts and Theoretical Perspectives	2020	<ol style="list-style-type: none"> 1. To Expose the students about nature and concept of Human Rights. 2. To apprise the students about the Liberal. Marxian prerspectives. 3. To expose the students that alternative, third world and Indian Perspectives of Human Rights,
	HR -102	Human rights in India: The Constitutional & Legal Frame Work	2020	<ol style="list-style-type: none"> 1. Students to know the Indian Constitution and Human Rights. 2. To understand the Judiciary and Human Rights. 3. To understand about Criminal Justice system in India.
3	HR – 103	Human Rights & Duties Education	2020	<ol style="list-style-type: none"> 1. To expose students about the importance of Human Rights and Duties education. 2. To apprise the students about the target groups for Human Rights 3. To expose the students about the content of Human Rights Education.

4	HR – 104	Rights & The Implementation Machinery	2020	<ol style="list-style-type: none"> 1. To expose the students about the implementation machineries at National Level and International Level. 2. The students understand about how the problems in Accessing Justice through Courts and Tribunals. 3. To expose the students that statutory bodies of
5	HR – 105(A)	Working Class And Human Rights And Duties	2020	<ol style="list-style-type: none"> 1. To understand the students about the status of working class, concept and issues. 2. To expose the student about the basic rights and duties of various sections.
5	HR – 105(B)	Human Rights Education, Teaching and Training	2020	<ol style="list-style-type: none"> 1. To expose the student about the origin, UNO and Human Rights education policies. 2. To apprise the students about the principles and practice in teaching of Human Rights
6	HR – 106(A)	Human Rights Activism and Role of NGO's	2020	<ol style="list-style-type: none"> 1. To expose the students about the different types of Human Rights Activisms. 2. To identify the student that the different Types of NGO's and their role for promoting the Human Rights.

7	HR – 106(B)	Social Movements and Human Rights in India	2020	<ol style="list-style-type: none"> 1. To expose the students about the role of NGOs for protecting human rights. 2. To Understand the student about the Political Movements, Ecological and Environmental Movements of Human Rights. 3. To apprise the student about the various types of Social and Political Reforms of Human
8	HR – 107	Human Values and Professional Ethics – I	2020	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values. 2. To understand the student about nature of Values, Ahimsa and various religion theories. 3. To assess the student about various Crime and Theories of punishments.
9	HR – 201	Human Rights & Indian Polity	2020	<ol style="list-style-type: none"> 1. To expose the students about the concept of basic structure of Indian Polity, administrative structure in India. 2. To apprise the student about the role of People's Agencies for protecting and promotion of human rights in India. 3. To understand the students about the Legislative Procedure and implementation process in
10	HR – 202	Emerging Dimensions of Human Rights	2020	<ol style="list-style-type: none"> 1. To expose the students about the Human Rights and Duties of Non-State Armed Groups and Commercial Corporations. 2. To understand the students about the rights of future generation. 3. To apprise the students about the Human Rights and Changing Dimension of State

11	HR – 203	Human Rights: The International Context	2020	<ol style="list-style-type: none"> 1. To understand the students about the evolution of human rights and UN charter of human rights. 2. To expose the students about regional dimensions of human rights and special conventions on human rights. 3. To understand the students about International
12	HR – 204	Research Methodology, Statistics and Computer Applications	2020	<ol style="list-style-type: none"> 1) Student to Know Scope of Social Research. 2) To Understand Data Analysis. 3) Understand About Types of Data Collections
13	HR – 205(A)	Human Rights: The Socio Economic Context	2020	<ol style="list-style-type: none"> 1. To expose the students about the socio, economic background of human rights. 2. To apprise the students about human rights of vulnerable groups. 3. To understand the students about the basic human need for development with respect to
14	HR – 205(B)	Societal Issues of Human Rights in India	2020	<ol style="list-style-type: none"> 1. To understand the student about the societal problems of human rights. 2. To understand the students about the social problems of minorities, scheduled caste and scheduled tribes. 3. To expose the students about Regionalism,

15	HR – 206(A)	Human Rights And Criminal Justice System	2020	<ol style="list-style-type: none"> 1. To expose the students about Rights of Inmates of Prisons and Custodial Homes. 2. To understand the students about the Right to Legal Aid, Access to Justice and Speedy Justice. 3. To expose the students that the problems of human rights.
16	HR – 207	Human Values and Professional Ethics – II	2020	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values. 2. To understand the student about nature of Values, Ahimsa and various religion theories. 3. To assess the student about various Crime and Theories of punishments.
17	HR – 301	Social Movements and Human Rights and Duties	2020	<ol style="list-style-type: none"> 1. To expose the student about conceptual perspectives of social movements and human rights. 2. To apprise the students about the social, political and religious reforms movements and human rights. 3. To expose the students that the role of International and National Institutions in promoting

18	HR – 302	Science, Technology, Human Rights and Duties	2020	<ol style="list-style-type: none"> 1. Understand the basic concept in science and technology and also about Indian perspective on science and technology. 2. Ability to know about the Right to Adequate Food, Agricultural, Biotechnology Impact of on Agriculture, Food Biotechnology and Revolution in Information Technology. 3. Analyse know rights to health and application of Biotechnology in Medicine and also about Intellectual Property Rights. 4. Assess the use of natural resource Environmental
19	HR – 303(A)	Human Rights and Duties Advocacy and Extension Work	2020	<ol style="list-style-type: none"> 1. To understand the students that the issues for peoples movements and public advocacy on human rights and duties 2. To understand the students on extension work with respect to human rights. 3. To understand the students about the uses of NGOs fact finding and uses of information
20	HR – 303 (B)	Socially / Economically disadvantaged People and human rights and duties	2020	<ol style="list-style-type: none"> 1. To expose the students about the concept of the Constitutional Safeguards and Special Protection Laws and Policies. 2. To understand the students about the concept of the disadvantaged people in the Indian Society. 3. To understand the students about the Institutional Mechanisms for protecting the human

21	HR – 303 (C)	Human duties and responsibilities	2020	<ol style="list-style-type: none"> 1. To understand the student about the concept of human duties and responsibilities. 2. To expose the student about human values and values of humanism. 3. To apprise the students about evaluation of human duties.
22	HR – 303 (D)	Children and human rights and duties	2020	<ol style="list-style-type: none"> 1. To understand the student about the concepts of Child Labour and protecting norms at National and International level. 2. To apprise the student that the status of children in Indian society with respect to human rights. 3. To understand the students about the National and International mechanisms for protecting
23	HR – 304	Soft and employability skills	2020	<ol style="list-style-type: none"> 1. To understand the student that the concepts of soft skills with respect to human rights. 2. To understand the student in employability skills in human rights aspects. 3. To expose the students that the professional skills for team building and problem solving.

24	HR – 305 (A)	Historical and Philosophical Perspectives of Human Rights	2020	<ol style="list-style-type: none"> 1. To expose the student that the a basic understanding to the concepts of human rights, human values, dignity, justice and equality. 2. To understand the students that the theories of human rights in various inter disciplinary dimensions. 3. To apprise the student that the concept of Magna Carta-Billof Right-French and
25	HR – 305 (B)	Human Rights and Duties in India	2020	<ol style="list-style-type: none"> 1. To understand the students about the concepts of Constitutional Human Rights and Responsibilities. 2. To apprise the students that Extra-ordinary situations and human rights in India. 3. To understand the violations of rights in present Civil Society in India.
26	HR – 401	Human rights in andhra pradesh	2020	<ol style="list-style-type: none"> 1. To expose the students about various Human Rights Movements at National and State (Andhra Pradesh) Level. 2. To understand the concept of social stratification and problems of Caste and Un-touchability. 3. To expose the students that the gender inequality and various gender violation in Andhra Pradesh.

27	HR – 402	Development, trade and human rights	2020	<ol style="list-style-type: none"> 1. To understand the student about the concept of human rights of various vulnerable groups at National and International level. 2. To apprise the student about the Trade related human rights violations and Trade development. 3. To understand the student about the role of human rights in development.
28	HR – 403(A)	International humanitarian and refugee Laws	2020	<ol style="list-style-type: none"> 1. To expose the students about the concepts of International Humanitarian Law and Implementation enforcements of IHL. 2. To apprise the student about the concept of International Refugee Law and protection under International Law. 3. To understand the students about solution to Refugee Problem.
29	HR – 403(B)	Environment and human rights and duties	2020	<ol style="list-style-type: none"> 1. To expose the student about the concept of Environment and rights to clean environment. 2. To apprise the students about the International regimes for protection. 3. To understand the students about the role of various agencies for protecting environment with respect to human rights.

30	HR – 403(C)	International human rights system	2020	<ol style="list-style-type: none"> 1. To expose the student about the concept of the International Human Rights systems. 2. To understand the student about the International Organisations for protecting the Human Rights. 3. To understand the students about the UN Organs and Human Rights.
31	HR – 403(D)	Minorities and human rights and duties	2020	<ol style="list-style-type: none"> 1. To student understand that the concept of evolutionary perspectives and Institutional mechanisms for protection of Minorities. 2. To expose the student that rights and duties of Minorities under in the Indian System. 3. To apprise the student that the Minorities and human rights challenges.
32	HR – 405(A)	Development, Globalization and Human Rights	2020	<ol style="list-style-type: none"> 1. Understand to role of Human Rights in Development and various theories of development. 2. Analyses the new international Economic Order (NIEO), WTO GATT and International Trade and Human Rights Perspective in India. 3. Evaluvate the Globalisation and its impact on agriculture, environment, labour, women culture and health

33	HR – 405(B)	Women and human rights and duties	2020	<ol style="list-style-type: none"> 1. To expose the students about the concept or the status of women in various sectors with respective human rights. 2. To expose students about the National and International norms for protection at International and National level. 3. To apprise the students about the Institutional mechanisms for Protection of rights of
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Social Development

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	HR 101	Human Rights: Concepts and Theoretical Perspectives	2020	<ol style="list-style-type: none"> 1. To Expose the students about nature and concept of Human Rights. 2. To apprise the students about the Liberal. Marxian prerspectives. 3. To expose the students that alternative, third world and Indian Perspectives of Human Rights,
2.	HR 102	Human Rights in India the constitutional and Legal	2020	<ol style="list-style-type: none"> 1. Students to know the Indian Constitution and

		Framework		Human Rights. 2. To understand the Judiciary and Human Rights. 3. To understand about Criminal Justice system in India.
3.	HR 103	Human Rights and Duties Education	2020	<ol style="list-style-type: none"> 1. To expose students about the importance of Human Rights and Duties education. 2. To apprise the students about the target groups for Human Rights <p>To expose the students about the content of Human Rights Education.</p>
4.	HR 104	Rights and the implementation Machinery	2020	<ol style="list-style-type: none"> 1. To expose the students about the implementation machineries at National Level and International Level. 2. The students understand about how the problems in Accessing Justice through Courts and Tribunals. 3. To expose the students that statutory bodies of Human Rights.
5.	HR 105 A	Working Class and Human	2020	

		Rights and Duties		<ol style="list-style-type: none"> 1. To understand the students about the status of working class, concept and issues. 2. To expose the student about the basic rights and duties of various sections. 3. To understand the Indian Constitutional Frame work.
6.	HR 105 B	Human Rights Education, Teaching and Training	2020	<ol style="list-style-type: none"> 1. To expose the student about the origin, UNO and Human Rights education policies. 2. To apprise the students about the principles and practice in teaching of Human Rights Education. 3. To understand the student about training aspects of Human Rights.
7.	HR 106 A	Human Rights Activism and Role of NGOs	2020	<ol style="list-style-type: none"> 1. To expose the students about the different types of Human Rights Activisms. 2. To identify the student that the different Types of NGO's and their role for promoting the Human Rights.
8.	HR 106 B	Social Movements and Human Rights in India	2020	<ol style="list-style-type: none"> 1. To expose the students about the role of NGOs for protecting human rights. 2. To Understand the student about the Political Movements, Ecological and Environmental Movements of Human Rights. 3. To apprise the student about the various types of Social and Political Reforms of Human

				Rights.
9.	HR 107	Human Values and Professional Ethics - I	2020	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values. 2. To understand the student about nature of Values, Ahimsa and various religion theories. 3. To assess the student about various Crime and Theories of punishments
10.	HR201	Human Rights and Indian Polity	2020	<ol style="list-style-type: none"> 1. To expose the students about the concept of basic structure of Indian Polity, administrative structure in India. 2. To apprise the student about the role of People's Agencies for protecting and promotion of human rights in India. 3. To understand the students about the Legislative Procedure and implementation process in India.
11.	HR202	Emerging Dimensions of Human Rights	2020	<ol style="list-style-type: none"> 1. To expose the students about the Human Rights and Duties of Non-State Armed Groups and Commercial Corporations. 2. To understand the students about the rights of future generation. 3. To apprise the students about the Human Rights and Changing Dimension of State Sovereignty and Humanitarian' Intervention.

12.	HR203	Human Rights: The International Context	2020	<ol style="list-style-type: none"> 1. To understand the students about the evolution of human rights and UN charter of human rights. 2. To expose the students about regional dimensions of human rights and special conventions on human rights. 3. To understand the students about International conventions on human rights and duties.
13.	HR204	Research Methodology, Statics and Computer Applications	2020	<ol style="list-style-type: none"> 1) Student to Know Scope of Social Research. 2) To Understand Data Analysis. 3) Understand About Types of Data Collections
14.	HR205 A	Human Rights – The Socio Economic Context	2020	<ol style="list-style-type: none"> 1. To expose the students about the socio, economic background of human rights. 2. To apprise the students about human rights of vulnerable groups. 3. To understand the students about the basic human need for development with respect to human rights.
15.	HR205 B	Societal Problems of Human Rights in India	2020	<ol style="list-style-type: none"> 1. To understand the student about the societal problems of human rights. 2. To understand the students about the social

				<p>problems of minorities, scheduled caste and scheduled tribes.</p> <p>3. To expose the students about Regionalism, terrorism.</p>
16.	HR206 A	Human Rights and Criminal Justice System	2020	<p>1. To expose the students about Rights of Inmates of Prisons and Custodial Homes.</p> <p>2. To understand the students about the Right to Legal Aid, Access to Justice and Speedy Justice.</p> <p>3. To expose the students that the problems of human rights.</p>
17.	HR207	Human Values and Professional Ethics - II	2020	<p>1. To expose the student about the concept and nature of human values.</p> <p>2. To understand the student about nature of Values, Ahimsa and various religion theories.</p> <p>3. To assess the student about various Crime and Theories of punishments.</p>
18.	HR 301	Social Movements and Human Rights and Duties	2020	<p>1. To expose the student about conceptual perspectives of social movements and human rights.</p> <p>2. To apprise the students about the social, political and religious reforms movements</p>

				<p>and human rights.</p> <p>3. To expose the students that the role of International and National Institutions in promoting Human Rights.</p>
19.	HR 302	Science, Technology, Human Rights and Duties	2020	<p>1. Understand the basic concept in science and technology and also about Indian perspective on science and technology.</p> <p>2. Ability to know about the Right to Adequate Food, Agricultural, Biotechnology Impact of on Agriculture, Food Biotechnology and Revolution in Information Technology.</p> <p>3. Analyse know rights to health and application of Biotechnology in Medicine and also about Intellectual Property Rights.</p> <p>4. Assess the use of natural resource Environmental Biotechnology and Use Technologies</p>
20.	HR 303 A	Human Rights and Duties – Advocacy and Extension work and Viva-Voce	2020	<p>1. To understand the students that the issues for peoples movements and public advocacy on human rights and duties</p>

				<ol style="list-style-type: none"> 2. To understand the students on extension work with respect to human rights. 3. To understand the students about the uses of NGOs fact finding and uses of information media.
21.	HR 303 B	Socially/Economically Disadvantaged people and Human Rights and Duties	2020	<ol style="list-style-type: none"> 1. To expose the students about the concept of the Constitutional Safeguards and Special Protection Laws and Policies. 2. To understand the students about the concept of the disadvantaged people in the Indian Society. 3. To understand the students about the Institutional Mechanisms for protecting the human rights of the disadvantaged groups.
22.	HR 303 C	Human Duties and Responsibilities	2020	<ol style="list-style-type: none"> 1. To understand the student about the concept of human duties and responsibilities. 2. To expose the student about human values and values of humanism. 3. To apprise the students about evaluation of human duties.

23.	HR 303 D	Children and Human Rights and Duties	2020	<ol style="list-style-type: none"> 1. To understand the student about the concepts of Child Labour and protecting norms at National and International level. 2. To apprise the student that the status of children in Indian society with respect to human rights. 3. To understand the students about the National and International mechanisms for protecting the child rights.
24.	HR 304	Soft Skills	2020	<ol style="list-style-type: none"> 1. To understand the student that the concepts of soft skills with respect to human rights. 2. To understand the student in employability skills in human rights aspects. 3. To expose the students that the professional skills for team building and problem solving.
25.	HR 305 A	Historical and Philosophical Perspectives of Human Rights	2020	<ol style="list-style-type: none"> 1. To expose the student that the a basic understanding to the concepts of human rights, human values, dignity, justice and equality. 2. To understand the students that the theories of human rights in various inter disciplinary dimensions.

				<ol style="list-style-type: none"> 3. To apprise the student that the concept of Magna Carta-Bill of Right-French and American- Declaration and Uncharted on human rights.
26.	HR 305 B	Human Rights and Duties in India	2020	<ol style="list-style-type: none"> 1. To understand the students about the concepts of Constitutional Human Rights and Responsibilities. 2. To apprise the students that Extra-ordinary situations and human rights in India. 3. To understand the violations of rights in present Civil Society in India.
27.	HR 401	Human Rights in Andhra Pradesh	2020	<ol style="list-style-type: none"> 1. To expose the students about various Human Rights Movements at National and State (Andhra Pradesh) Level. 2. To understand the concept of social stratification and problems of Caste and Un-touchability. 3. To expose the students that the gender inequality and various gender violation in Andhra Pradesh.
28.	HR 402	Development, Trade and Human Rights	2020	<ol style="list-style-type: none"> 1. To understand the student about the concept of human rights of various vulnerable groups at National and International level. 2. To apprise the student about the Trade related human rights violations and Trade development. 3. To understand the student about the role of

				human rights in development.
29.	HR 403 A	International, Humanitarian and Refugee Laws	2020	<ol style="list-style-type: none"> 1. To expose the students about the concepts of International Humanitarian Law and Implementation enforcements of IHL. 2. To apprise the student about the concept of International Refugee Law and protection under International Law. 3. To understand the students about solution to Refugee Problem.
30.	HR 403 B	Environment and Human Rights and Duties	2020	<ol style="list-style-type: none"> 1. To expose the student about the concept of Environment and rights to clean environment. 2. To apprise the students about the International regimes for protection. 3. To understand the students about the role of various agencies for protecting environment with respect to human rights.
31.	HR 403 C	Human Rights and Criminal Justice System	2020	<ol style="list-style-type: none"> 1. To expose the student about the concept of the International Human Rights systems. 2. To understand the student about the International Organisations for protecting the Human Rights. 3. To understand the students about the UN Organs and Human Rights.

32.	HR 403 D	Minorities and Human Rights and Duties	2020	<ol style="list-style-type: none"> 1. To student understand that the concept of evolutionary perspectives and Institutional mechanisms for protection of Minorities. 2. To expose the student that rights and duties of Minorities under in the Indian System. 3. To apprise the student that the Minorities and human rights challenges.
33.	HR 405 A	Development, Globalization and Human Rights	2020	<ol style="list-style-type: none"> 1. Understand to role of Human Rights in Development and various theories of development. 2. Analyses the new international Economic Order (NIEO),WTO GATT and International Trade and Human Rights Perspective in India. 3. Evaluvate the Globalisation and its impact on agriculture,

				<p>environment, labour, women, culture and health.</p> <p>4. Know about the Transnational Corporations (TNCs) and Human Rights violations and Impact of GATT-WTO on sovereignty.</p>
34.	HR 405 B	Women and Human Rights and Duties	2020	<ol style="list-style-type: none"> 1. To expose the students about the concept or the status of women in various sectors with respective human rights. 2. To expose students about the National and International norms for protection at International and National level. 3. To apprise the students about the Institutional mechanisms for Protection of rights of women.

15. Law

S.No	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	CO -101	Mass Media Law	2020	<ul style="list-style-type: none"> a. Have a detailed and sophisticated understanding of the general principles governing freedom of speech, the public interest and the media; b. Have a detailed, technical and specialised understanding of the constraints imposed on the media in the reporting of court proceedings; c. Have developed the ability to independently understand, research and critically analyse legal and scholarly developments that contribute to professional practice in the area of media law; and d. Have a detailed, technical and specialised understanding of defamation law in India and comparatively; e. Have developed expert knowledge of the practical operation of defamation law in India and comparatively;
2	CO-102	Public Utilities Law	2020	<ul style="list-style-type: none"> a. government policy in regard to such utilities in general and to each utility in particular, b. The growth and evolution of the public utilities; c. patters of the laws of incorporation and d. powers, functions and liabilities of the

				public utilities vis-a-vis their employees, consumers and others.
3	CO- 103	Law and Social Transformation in India	2020	<ul style="list-style-type: none"> a. Critically analyse the Law as an instrument of social change and product of tradition and culture b. Explore the nature and function of Law as an institution and process interlinked with the social and economical philosophy of education. c. Examine development of law from historical processes and how for the a touch of modernization and value can be added to legal system d. To analyse the different approaches of Law and Justice
4	CO - 104	Indian Constitutional Law: The New Challenges	2020	<ul style="list-style-type: none"> a. Understand and interpret Constitution to address the emerging complex issues; b. Explore the various functional theories, doctrine and Constitutional principles working in the backdrop and its interplay with the emerging issues; and c. Examine the boundaries, limitations, of Constitution from different perspectives and explore the possible approaches of interpretation and understanding from the perspective of Law and Justice.
5	CO - 201	Union – State Finance Relations	2020	<ul style="list-style-type: none"> a. To understand India as development of complex federal structure (Quasi) federal and its strength and weaknesses;

				<ul style="list-style-type: none"> b. Explore the various functional theories, doctrine and Constitutional principles of federalism and its interplay under Indian Constitution; and c. To examine the area of conflicting interest between Union and State and primacy of Union over the State.
6	CO - 202	Constitutionalism, Pluralism and Federalism	2020	<ul style="list-style-type: none"> a. To explore the basic principles of Constitutionalism, different model of federalism and its interplay in the Indian legal system; b. To examine the adoption of, utility and justification of Constitutional model in India; and c. To analyse India as pluralist society and suitability of various model, approaches in India in functional aspects of comparison with other legal system.
7	CO – 203	Judicial Process	2020	<ul style="list-style-type: none"> a. Intended to highlight the role of court as policy maker, participant in the power process and as an instrument of social change. b. expose the intricacies of judicial creativity and the judicial tools and techniques employed in the process. c. Since the ultimate aim of any legal process or system is pursuit of justice, a systematic study of the concept of justice and its various theoretical foundations is required.

				d. Intends to familiarise the students with various theories, different aspects and alternative ways, of attaining justice.
8	CO – 204	Legal Education and Research Methodology	2020	<ul style="list-style-type: none"> a. Critically analyse the various research skill, especially in the field of law; b. To develop the skill of application of teaching methods in legal education c. To understand and analyse the various strength and weakness of teaching learning and research process for the field of law; and d. To develop the skill of utilising computer technology for Legal education and Legal research.
9	CO – 301	Human Rights	2020	<ul style="list-style-type: none"> a. Acknowledge the social and economic rights of workers, forced labour, child labour, bonded labour, slavery, trade union, social security, right to health, standard of living, protection of families etc. b. To gain and acquire the knowledge about cultural rights of indigenous population. c. Understand the third-generation solidarity right of various populations. d. Acknowledge the ideas and knowledge about Human right Protection system of United Nations in the light of Covenant of Civil and Political rights.

10	CO – 302	National Security, Public Order and Rule of Law	2020	<ul style="list-style-type: none"> a. Understand and interpret various provision and safeguards to protection national security; b. To explore the various approach of public order, importance of rule of law and different legislations; c. Balancing the civil liberties and power of state; and d. Explore the various functional institution like election commission, parliament and check and balance on the national importance.
11	CO- 303	Practical Training	2020	<ul style="list-style-type: none"> a. Critically apply the understanding and application of legal research principles to legal research writing; b. To explore the various stages and its application for the practical record work; c. To have the development of idea, and its application; d. To have the ability to provide the original and non-plagiarised work to the existing field of knowledge e. Legal aid Camps and Legal Literacy Programmes, Court Observation work. f. On the completion of the course students will develop an inclination towards research and academics.
12	CO- 304a	Environment Protection	2020	<ul style="list-style-type: none"> a. Study the relationship between environment

		and The Law		and climate change as well as the role of law, judiciary, resolution mechanisms but the alternate energy solutions and how people are dealing with climate changes, environmental laws and implementation of available solutions.
13	CO- 304b	Intellectual Property Rights Law	2020	<ul style="list-style-type: none"> a. To give philosophical underpinnings of traditional notion of property and IP • b. To examine the link between Industrial development & IP protection • To examine the conceptual development of IP concepts through judicial approach • c. To examine the impact of IP on economy, health and daily activities • d. To understand the basic principles enunciated in international agreements relating to IP
14	CO- 401	Dissertation and Viva-Voce	2020	<ul style="list-style-type: none"> a. Identify key research questions within the field of Demography on which you will carry out independent research. b. Manage your time effectively whilst working on your independent research. c. Demonstrate appropriate referencing and develop skills in other aspects of academic writing. d. Demonstrate knowledge and understanding of report writing. e. Apply the demographic/statistical research training acquired in the taught element of

				the programme by designing an appropriate research strategy and research methodology to carry out your research
15	CO – 402a	Law of Consumer Protection	2020	<ul style="list-style-type: none"> a. Define provision under the Consumer Protection and Right to Information Act and apply them to situations accordingly b. Draft a consumer complaint with ease c. Confidently approach a Consumer Forum and get aware of the redressal mechanism d. To expose the students about Consumer Protection Laws; e. To develop the conceptual understanding of Consumer Protection regime.
16	CO- 404 b	International Human Rights (MOOC / ONLINE COURSE)	2020	<ul style="list-style-type: none"> a. Analyze and comment on key controversies surrounding the development of international human rights law b. Use conceptual tools to follow the developments of human rights law c. Be most effective in contributing to the enforcement of international human rights law

16. Library and Information Science

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
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1	LIS-101	Foundation of Library and Information Science	2020	<ol style="list-style-type: none"> 1. Know the various types of libraries and their role in the society 2. Learn the Professional ethics and library Legislation in India 3. Understand LIS education in India and various library associations in India
2	LIS102	Knowledge Organization: Classification Theory	2020	<ol style="list-style-type: none"> 1.. Understand the definition, need and purpose of classification 2. Learn the Fundamental Categories, Facet Analysis, types of Isolates in all schemes of classification 3. Understand the Notation, trends and developments in Classification
3	LIS-103P	Knowledge Organization: Classification Practice	2020	<ol style="list-style-type: none"> 1. Learn the Dewey Decimal Classification Scheme 2. Get the skill regarding assigning the class numbers 3. Have knowledge on Tables and Schedules of DDC

4	LIS-104	Knowledge Management	2020	<p>1. Get an idea on the concepts of knowledge management, types of knowledge</p> <p>2. Understand the knowledge creation models, knowledge transfer in E-World</p> <p>3. know the tools for knowledge management and neural network and datamining</p>
5	LIS-105	Introduction to Information Technology	2020	<p>1. Gain knowledge on the concepts of computer basics and Network technologies</p> <p>2. Understand the concepts of Operating Systems, Programming Languages and types of softwares</p> <p>3. Learn the Database Management systems, steps in development of databases and get an idea on different library software packages</p>
6.	LIS-106	Human Values and Professional	2020	i. The student will be enriched with

		Ethics-I		<p>several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
7.	LIS-201	Information Sources and Services	2020	<p>1.Learn documentary and non-documentary sources and different types of information sources</p> <p>2.Know about the Indian and British National Bibliographies, and Electronic Books</p> <p>3.Understand the virtual reference service and translation Services</p>
8.	LIS-202	Knowledge Organization: cataloguing Theory	2020	<p>1.Understand the basic ideas on catalogue, forms of the catalogue, Main Entry and added entries</p>

				<p>2. Know the Canons, Principles and Laws of Cataloguing</p> <p>3. Gain the knowledge on different types of subject headings, Cooperative and Centralized cataloguing</p>
9.	LIS-203P	Knowledge cataloguing Practice Organization:	2020	<p>1. Gain knowledge on Anglo American Cataloguing Rules</p> <p>2. Learn the preparation of Main entry and added entries for monographs and serial publications</p> <p>3. Gain the skills on preparation of entries on cartographic materials, manuscripts and sound recordings</p>
10.	LIS-204P	Meta data Standards- Practice	2020	<p>1. Know the Metadata and its types, standards</p> <p>2. Learn the skills on KOHA Software</p> <p>3. Learn the skills on MARC 21 and Dublincore</p>
11	LIS-205	Library Management	2020	<p>1. Gain knowledge on meaning and purpose of management, Organizational Structures</p> <p>2. Able to identify the factors behind selection, procurement and accessioning of documents</p> <p>3. Gain knowledge on a circulation system</p>

				suitable for a library, different budgetary methods and its standards, norms and principles
12	LIS-206	Human Values and Professional Ethics-II	2020	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	LIS-301	Information Processing and Retrieval Theory	2020	<p>1.Understand the basic concepts on Information procession and Retrieval and various schemes on classification</p> <p>2.Learn the Indexing Systems and Techniques and their Evaluation Criteria and Studies</p> <p>3.Gain knowledge on Web based Information Retrieval Systems</p>
14	LIS-302	Library Automation and Digital Library	2020	<p>1.Learn the basics of Library Automation, various modules of library automation software packages and their features</p> <p>2.Gain knowledge on basic concepts and characteristics of digital libraries</p> <p>3.Know about network and</p>

				communication devices, digitization and metadata
15	LIS-303	Search and Search strategies	2020	<p>1.Gain knowledge on search strategies, various types of databases, internet searching tools</p> <p>2.Understand Z39.50 protocol and Wide area information servers</p> <p>3. 3.Learn the search engines and meta search engines.</p>
16	LIS-304B	Internship	2020	<p>1.Attain skills on all types of sections and its maintenance in libraries in which they underwent training</p> <p>2.Get skills on maintenance of Digital Library</p> <p>3.Learn the skills on preservation and conservation of manuscripts and digitization.</p>
17	LIS-304C	Academic Library System	2020	<p>1.Know the basic objectives, growth and development of Academic Libraries in India, UK and USA</p> <p>2.Learn about an overview of higher education in India, UGC, its powers and functions and its role in the development of academic libraries</p> <p>3.Understand the total design of the building, techniques of financial management, and know the organization of library and information services needed by distance learners and special users</p>

18	LIS-305A	Information Literacy (OE)	2020	<p>1.Learn the concepts of Information Literacy and sources of Print and Electronic Information</p> <p>2.Get the skills on information access through INFLIBNET Network</p> <p>3.Able to understand the Internet and its search techniques and Intellectual Property Right</p>
19	LIS-401	Research Methodology	2020	<p>1.Understand the definition, need and purpose of various research methods</p> <p>2.Get the knowledge on Research design, techniques and tools</p> <p>3.Gain the skills on Data analysis and Interpretation of Data in SPSS.</p>
20	LIS-402P	Software for Libraries-Practice	2020	<p>1.Attain knowledge on D Space, Greenstone Digital Library Softwares</p> <p>2.Learn about Koha : Library Management Software, E-Resources, Directory of Open Access Journals,</p> <p>3.Get an idea on designing of Web Page and Data Mining</p>
21	LIS-403	Dissertation/Project Work	2020	<p>1.Gain Knowledge on how to select the theme for their work</p> <p>2.Learn the writing styles, preparation of questionnaire, data analysis and interpretation and Citation styles</p> <p>3.Get the skills on findings and conclusion in dissertation</p>
22	LIS-403A	Management of Information	2020	<p>1.Know the basic concepts in</p>

		System		Management, and various methods of decision-making and its application to Library and Information Centers 2.Understand the budgeting techniques and methods and policies and procedures 3.Gain knowledge on system analysis, PERT/CPM
23	LIS -404C	Information Processing and Retrieval: UDC and Indexing Practice	2020	1.Gain knowledge on Universal Decimal Classification 2.Learn different Indexing systems 3.Understand the design and development of thesaurus
24	LIS-405-B	Technical Writing	2020	1.Know the definition and types of technical writing 2.Attain the idea on technical writing process and styles 3.Get the skills on technical writing techniques, use of MS-Office for preparation and presentation of technical writing

18. Performing Arts(Music)

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1	162	MA Performing Arts(Music)	2020	PAM-105-A (P) Abhyasa Gana -1 Clear cut training of foundation in Carnatic Music
2	162	MA Performing Arts(Music)	2020	PAM-105 -B (P) Abhyasa Gana-2 Clear cut training of foundation in Carnatic Music which helps to understand the effective aspects of the program
3	162	MA Performing Arts(Music)	2020	PAM-105-C (P) Abhyasa Gana-3 Basic level voice culture training of foundation in Carnatic Music which helps the student to adopt any voice change for rendering light music , classical and semi classical
4	162	MA Performing Arts(Music)	2020	PA-M 204 Compositions in Rare ragas widening knowledge of the student to perform rare ragas which is challenging in nature
5	162	MA Performing Arts(Music)	2020	PA-M 205 (a) Abhyasa Gana -4 Clear advance level training of foundation in Carnatic Music
6	162	MA Performing Arts(Music)	2020	PA-M 205 (b) Abhyasa Gana -5 Clear cut advance level training of foundation in Carnatic Music
7	162	MA Performing Arts(Music)	2020	PA-M 205 (C) C Abhyasa Gana -6 Clear cut advance level training of foundation in Carnatic Music
8	162	MA Performing Arts(Music)	2020	PA-M 206 (a) Compositions from Geya Natakas Compositions from other genre of music will give wide oppurtunity for employment
9	162	MA Performing Arts(Music)	2020	PA-M 302 Group kritis widening knowledge to perform group kritis
10	162	MA Performing Arts(Music)	2020	PA-M 303 A Vakra Ragas Ability to plan and execute a successful Carnatic concert

				Ability to create new variety in Concerts
11	162	MA Performing Arts(Music)	2020	PA-M 303 B Manodharma Sangita To enrich the knowledge of innovative music in students
12	162	MA Performing Arts(Music)	2020	PA-M 303 D Post trinity compositions To educate the student about the recent past composition of Carnatic music
13	162	MA Performing Arts(Music)	2020	PA-M 304 Communication & Soft Skills (T) To promote soft skills among the students so as to develop attributes that could enhance interactions, earning power and job performance.
14	162	MA Performing Arts(Music)	2020	PA-M 305 - A – Patriotic /Folk Songs To inculcate students about patriotism and to educate about the music of the Land.
15	162	MA Performing Arts(Music)	2020	PA-M 402 Concert Ability to plan and execute a successful Carnatic concert Ability to create self employment opportunity
16	162	MA Performing Arts(Music)	2020	PA-M 403 A Ragam Tanam Pallavi Learn and inculcate the most creative part of Carnatic Music To help student to shape out the creative rendering style of the student
17	162	MA Performing Arts(Music)	2020	PA-M 403-BCompositions of Dance Repertoire Knowledge in application of music in other art fields like theatre, opera etc Knowledge to select and utilize ragas according to the theme and text.
18	162	MA Performing Arts(Music)	2020	PA – M 403 - C Post trinity composers- 20th century and beyond To make the student aware about the musical forms of recent personalities of

				Carnatic music
19	162	MA Performing Arts(Music)	2020	PA-M 404 Project work Introduce to the methodology of doing research in music and introducing to data collection, analysis etc and train up him to look into the facts based on evidences
20	162	MA Performing Arts(Music)	2020	PA – M 405 - A - Compositions of Annamacharya To educate students about devotional music of Tirupati deity and the composer. Music of this land

16.philosophy				
S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Classical Indian Philosophy	2020	.1The Student has applied the knowledge of classical Indian Philosophy. 2.The Student has analyzed the principles of classical Indian Philosophy
2	102	Epistemology Indian	2020	1. The Student has known the Indian Epistemology 2. The Student has understood the

				Pramanas in Indian Philosophy
3	103	Logic Indian and Western	2020	<ol style="list-style-type: none"> 1. The Student has known the Indian Epistemology 2. The Student has understood the Pramanas in Indian Philosophy
4	104	Western Philosophy- Greek and Medieval	2020	<ol style="list-style-type: none"> 1.The Student has known the important issues of Western Philosophy 2. The Student has understood the Principles of greek and medieval Philosophy
5	105-A	Problems in Metaphysics	2020	<ol style="list-style-type: none"> 1. The Student has known the Problems of Metaphysics 2. The Student has understood the Principles of Metaphysics
6	202	Ethics- Indian	2020	<ol style="list-style-type: none"> 1. The Student has known the Ethics in Indian Philosophy 2. The Student has understood the various

				Ethical Principles in Indian Ethics.
7	203	Ethics –Western	2020	<ol style="list-style-type: none"> 1. The Student has known the Ethics in Western Philosophy 2. The Student has understood the Ethical theories of Western Philosophy
8	204	Modern Western Philosophy	2020	<ol style="list-style-type: none"> 1. The Student has known the Problems of Modern Western Philosophy 2. The Student has understood the thoughts of Modern Western Philosophers.
9	205-A	Philosophy of Education	2020	<ol style="list-style-type: none"> 1. The Student has known the Contents of Philosophy of Education. 2. The Student has understood the Educational aspects of Philosophy of Educatio
10	207	Audit course (HVPE)	2020	<ol style="list-style-type: none"> 1. The Student has known the essence contents of human values. 2. The Student has understood the Professional Ethics..
11	301	Social and Political Philosophy	2020	<ol style="list-style-type: none"> 1. The Student has known the contents of social Philosophy. 2. The Student has understood the Principles of Political Philosophy.

12	302	Philosophy of Vedanta	2020	<p>1 . The Student has known the Philosophy of Vedanta.</p> <p>2. The Student has understood the Philosophical Doctrines of Vedantas</p>
13	303-A	Philosophical Approach to Gandhi	2020	<p>1. The Student has known the metaphysical issues of Gandhi.</p> <p>2. The Student has understood the Gandhian Philosophy</p>
14	303-B	Philosophy of B.R.Ambedkar	2020	<p>1. The Student has analyzed the Philosophy of Ambedkar..</p> <p>2. The Student has applied the Philosophical aspects of Ambedkar.</p>
15	305-A	Philosophy of Value Education	2020	<p>1.The Student has known the importance of Education...</p> <p>2. The Student has understood the Philosophical values for life.</p>
16	305-B	Sri Venkateswara Studies	2020	
17	401	Phenomenology and Existentialism	2020	<p>1. The Student has analyzed the contents of Phenomenology..</p> <p>2. The Student has applied the Philosophical Principles of Existentialism</p>
18	402	Comparative Religion	2020	<p>a.The Student has analyzed the aspects of Comparative Religion..</p>

				b. The Student has applied the Philosophical Principles of different Religions
19	403-A	Philosophy of Jiddu Krishnamurti	2020	<p>1.The Student has known the Philosophy of Jiddu Krishnamurti...</p> <p>2. The Student has understood the Philosophical insights and of jiddu Krishnamurti</p>
20	403-B	Analytical Philosophy	2020	<p>1. The Student has known the contents of Analytical Philosophy.</p> <p>2. The Student has understood thePhilosophy of Philosophers of Analytical Philosophy..</p>
21	403-C	Sri Vaishnavism	2020	<p>1.The Student has analyzed the aspects of SriVaishnavism..</p> <p>2. The Student has applied the Philosophical Principles of .SriVaishvaism</p>
22	403-D	Research Methodology and Computer Applications	2020	<p>1.The Student has analyzed the principles of Research Methodology..</p> <p>2. The Student has applied the computer operating and applying principles</p>

23	404	Philosophy of Peace	2020	
24	405-A	Philosophy of Yoga	2020	1.The Student has analyzed the principles of Research Methodology.. 2. The Student has applied the computer operating and applying principles

20. Physical Education

S.No	Name of the Course	Course Code	Year of introduction	Course Outcomes
1	B.P.Ed	Bachelor of Physical Education	2014-15	100%
2	Ph.D	Ph.D	2008	100%

21. Political Science & Public Administration

S.No	Name of the Course	Course Code	Year of introduction	Course Outcomes
1	PSC - 101	Population characteristics and theories	2020	1. Identify basic demographic concepts and definitions in Population studies 2. Impart knowledge on Population trends in size and growth of population at regional, national and global level. 3. Discover the implications of different theories on past and present population components with special reference to Malthusian theory
2	PSC - 102	Fertility	2020	1. Examine the basic concepts and

				<p>measurements of fertility</p> <ol style="list-style-type: none"> 2. Assess, compare and contrast trends in fertility and its determinants 3. Familiarize the concepts of nuptiality and factors affecting nuptiality 4. Examine theories related to fertility and its applications in different situations
3	PSC - 103	Mortality	2020	<ol style="list-style-type: none"> 1. Identify the various concepts and measures of mortality 2. Examine the global levels and trends in mortality and its determinants 3. Acquire knowledge on techniques of life tables, constructions of multiple-decrement life table and computational aspects for demographical analysis
4	PSC - 104	Sources, evaluation and adjustment of data	2020	<ol style="list-style-type: none"> 1. Examine and compare merits and demerits of various sources of population data 2. Understand the evaluation of data, factors affecting completeness of data 3. Reproduce knowledge on population projections, calculations and applications
5	PSC – 105 (A)	Population education and extension	2020	<ol style="list-style-type: none"> 1. Examine the components of population education and create awareness on population education among the students and youth 2. Acquire skills to organize Extension Programmes in population education at school, college and Non formal educational levels 3. demonstrate training on population education methods and techniques in order to create awareness on population education

6	PSC – 105 (B)	Public health, nutrition and health education	2020	<ol style="list-style-type: none"> 1. Import knowledge on the importance of public health various health aspects, like curative, preventive and preventive aspects of public health. 2. Discover the indicators of health, food and its classification, Nutrition and balanced diet. 3. Imports knowledge n Nutritional policies and programmes, health education programmes and agencies involved in the health education.
7	PSC – 105 (C)	Health planning and policy	2020	<ol style="list-style-type: none"> 1. Understanding the Health services, indicators of health morbidity and mortality, structure and organization of health in India 2. Acquired knowledge on national and international agencies, NGO's involved in health programmes 3. Experiment skills in health planning process, decision making, budgeting and target setting in health programmes
8	PSC – 106 (A)	Population and development planning	2020	<ol style="list-style-type: none"> 1. Import knowledge on indicators of economic development, quality of life, human development index and modernization. 2. Discover the consequences population growths on economic development with special reference to demographic behavior, behaviour in the context of socio economic changes. 3. Identify food requirements and production,

				food security in relation to population growth
9	PSC – 106 (B)	Population and environment	2020	<ol style="list-style-type: none"> 1. Examine the human geography and its relevant to population studies with reference to ecology and eco-system. 2. Identify Environmental issue population global warming green house effect, ELNINO effect etc., 3. Examine the changing patterns conservations and management of land and policies, programme better management.
10	AUDIT COURSE: PSC	Human values and professional ethics – I	2020	<ol style="list-style-type: none"> 1. Acquire and gain knowledge on different concepts of human values and behavioural changes. 2. Recognizing the medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics of medical and health care professionals. 3. Acquire skills on environmental ethics and its relation to Health 4. Discover the Social ethics, human trafficking, human rights, and media ethics
11	PSC - 201	Migration and multi-regional demography	2020	<ol style="list-style-type: none"> 1. Explore the different types and trends in migration 2. Apply skills in measurement, causes and consequences of different migrations in different regions 3. Explore the theories and recommend

				suitable policies of migration
12	PSC - 202	N.G.O MANAGEMENT	2020	<ol style="list-style-type: none"> 1. Understand the role, importance and establishing of NGO's 2. Explore the sources of funding of NGO's at national and international level 3. Explore demographic data by working with individuals, groups and communities
13	PSC - 203	STATISTICAL METHODS	2020	<ol style="list-style-type: none"> 1. Familiarize the basic statistical methods and its applications to demographic data 2. Demonstrate knowledge on methods and techniques of sampling 3. Acquire skills in processing of data with computer 4. Demonstrate the testing of hypotheses, t-tests, Chi-square tests, correlation and regression
14	PSC - 204	POPULATION SOCIOLOGY	2020	<ol style="list-style-type: none"> 1. Examine the basic sociological concepts, and evaluate the relationship of sociology to other social sciences 2. Identify the social institutions, social change and socialization and explore the sociological theories of fertility and its application in contemporary society 3. Explore the present society and its relationship to individual
15	PSC - 205 (A)	Population and Sustainable Development	2020	<ol style="list-style-type: none"> 1. Examine the concepts and theoretical issues relating to sustainable development and sustainable goals 2. Assess and measure the quality of life,

				<p>resource creation, and management and distribution</p> <p>3. Critically think of the relationship between population, environment, poverty and population sustainable growth</p>
16	PSC – 205 (B)	Population economics	2020	<p>1. Gained knowledge on concepts of basic concepts of economics and its relation to population change</p> <p>2. Acquired knowledge on measurements of national income, income distribution causes and consequences of inequalities in income.</p> <p>3. Relate the population growth in relation to levels and trends, causes and policies of employment.</p>
17	PSC – 205 (C)	Cf: disaster management	2020	<p>1. Summarize and understand the disasters and Disaster Management</p> <p>2. Acquire a critical perspective of the policy framework, Institutional Structures and programmes for Disaster Management in India</p> <p>3. Explore Mental health consequences and able to provide Psychosocial care in Disaster Management</p>
18	PSC – 206 (A)	Community health	2020	<p>1. Discover comprehensive knowledge on concepts of community health, illness, disease prevention</p> <p>2. Critical thinking on epidemiology, communicable diseases and its prevention</p> <p>3. Understand and appreciate the concepts of health, nutrition, balance diet, nutrition</p>

				deficiency diseases and National Health Programmes
19	PSC – 206 (B)	Demographic data management	2020	<ol style="list-style-type: none"> 1. Import knowledge on census evaluation of Indian census and census organizations. 2. Identity the SRS system in India, Model registration scheme, population registers. 3. Discover the evaluation of census data, management techniques and errors in census, coverage and content errors.
20	AUDIT COURSE: PSC	Human values and professional ethics – ii	2020	<ol style="list-style-type: none"> 1. Acquire and gain knowledge on different concepts of human values and behavioural changes. 2. Recognizing the medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics of medical and health care professionals. 3. Acquire skills on environmental ethics and its relation to Health 4. Discover the Social ethics, human trafficking, human rights, and media ethics
21	PSC - 301	Population geography	2020	<ol style="list-style-type: none"> 1. Enumerate the geographical factors affecting the distribution of population 2. Awareness and understanding of trends in urbanization and its impact on ecological imbalance, global warming, greenhouse effects. 3. Able to assess changing pattern of land use, conservation of resources and critical thinking of policies, programmes for better

				management of environment
22	PSC – 302	Research methodology	2020	<ol style="list-style-type: none"> 1. Demonstrate in conducting population research and surveys 2. Prepare research design and apply sampling techniques 3. Discover skills in methods and tools of data collection, data analysis, interpretation, and report writing
23	PSC -303 (A)	Population psychology	2020	<ol style="list-style-type: none"> 1. Appreciate the scope of psychology and the relationship between value of children and fertility 2. Familiarize and comprehend the significant psychological theories relevant to fertility and contraceptive behavior 3. Demonstrate leadership and effective communication skills in promoting health and family planning
24	PSC – 303 (B)	Population policy and programmes	2020	<ol style="list-style-type: none"> 1. Explore population policies related to fertility, mortality and migration 2. Acquire the knowledge on methods of family planning and acts relating to medical termination of pregnancy, age at marriage and also registration of vital events 3. Apply best practices and strategies for promoting family welfare programme.
25	PSC - 303 (C)	Gerontology	2020	<ol style="list-style-type: none"> 1. Understand the scope of gerontology and demographic dimensions of the elderly 2. Critically explore and analyze changes in status of elderly health, problems and needs

				of elderly 3. Acquire skills in dealing elderly issues like neglect, abuse, violence and abandonment caregivers stress and elderly neglect
26	PSC – 303 (D)	Population ecology, urbanization and Migration	2020	1. Import knowledge on population policies influencing fertility, mortality and migration. 2. Discover the world population conferences and India conference on population policies programmes 3. Examine the Administrative setups of family welfare programmes at the National, state, district and PHCs levels
27	PSC -304 (A)	Soft and employability skills	2020	1. Expose to soft skills and listening and its employability, types of listening, effective listening and barriers to listening. 2. Import knowledge on communication skill and inter personal skills, types and stages. 3. Expose to employability skill and its stages, professional skill, decision making skills and stress management.
28	PSC – 305 (A):	Principles of population studies	2020	1. Explore the components of population change, trends in size and growth of population 2. Discover the concepts of fertility, mortality and migration 3. Acquire skills in exploring the sources and quality of data on fertility, mortality and migration

29	PSC – 305 (B)	Population, society and environment	2020	<ol style="list-style-type: none"> 1. Import knowledge on components of population changes and its social changes. 2. Discover the population and socio-economic changes and its consequences of demography and social problems. 3. Expose to ecology and Environment sustainable development in relation to population growth.
30	PSC - 401	Communication for family welfare programmes	2020	<ol style="list-style-type: none"> 1. Examine the elements in communication process 2. Understand and apply different approaches to communication 3. Critically analyse and apply factors influencing a various communication methods to promote family planning
31	PSC - 402	Reproductive health and adolescent issues	2020	<ol style="list-style-type: none"> 1. Examine the anatomy and physiology of human reproduction, conception and pregnancy 2. Describe the male and female reproductive health problems 3. Assess and examine various adolescent issues
32	PSC – 403 (A)	Population growth and development	2020	<ol style="list-style-type: none"> 1. Understand the indicators of development with special reference to population growth and development. 2. Discover the concepts of economic inequality and its causes

				3. Examine the status of women and development and demographic consequence of women empowerment
33	PSC – 403 (B)	Health economics	2020	<ol style="list-style-type: none"> 1. Explore the concepts in economics in relation to health and population dynamics 2. Acquire skills in assessing costing and health economics 3. Critically analyze and evaluate general health status and quality of life and also measurement of health outcomes
34	PSC – 403 (C):	Demography of andhra pradesh	2020	<ol style="list-style-type: none"> 1. Acquire knowledge on basic trends and changes in population growth in Andhra Pradesh 2. Examine the migration and urbanization, problems of slums and related policies with special reference to Andhra Pradesh 3. Explore the population policies and programmes in Andhra Pradesh
35	PSC – 403 (D)	Demographic techniques	2020	<ol style="list-style-type: none"> 1. Import knowledge on demographic techniques - life table, UN model life table, coale and demeny regional model life table. 2. Discover the stable population theory and its concept, measurement of migration and vital statistic methods. 3. Identity the interpolation smoothing of Age data and graduation techniques, projection of fertility, mortality and migration, Evaluation of projection.

36	PSC – 404	Disertation project work /	2020	<ol style="list-style-type: none"> 1. Develop in-depth knowledge of field work and community surveys 2. Acquire the skills to present and discuss the findings through seminars 3. Explore the skills in preparation and presentation of research findings
37	PSC -405 (A)	Rural, urban and tribal community development	2020	<ol style="list-style-type: none"> 1. Explore the characteristics of rural, urban and tribal community 2. Discover community development and experiment projects in rural, urban and tribal areas 3. Critically examine and understand the issues related to rural, urban and tribal areas and approaches to community development
38	PSC -405 (B)	Social policy and planning	2020	<ol style="list-style-type: none"> 1. Discover social policies in relation to Indian constitution. 2. Examine the approaches to social policy 3. Demonstrate and analyze various social policies and their implementation

22. Population Studies

S.No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1.	PS- 101	Population Characteristics and Theories	2020	<ol style="list-style-type: none"> i. Identify basic demographic concepts and definitions in Population studies ii. Impart knowledge on Population trends in

				<p>size and growth of population at regional, national and global level.</p> <p>iii. Discover the implications of different theories on past and present population components with special reference to Malthusian theory</p>
2.	PS - 102	Fertility	2020	<p>i. Examine the basic concepts and measurements of fertility</p> <p>ii. Assess, compare and contrast trends in fertility and its determinants</p> <p>iii. Familiarize the concepts of nuptiality and factors affecting nuptiality</p>
3.	PS – 103	Mortality	2020	<p>i. identify the various concepts and measures of mortality</p> <p>ii. Examine the global levels and trends in mortality and its determinants</p> <p>iii. Acquire knowledge on techniques of life tables, constructions of multiple-decrement life table and computational aspects for demographical analysis</p>
4.	PS 104	Sources, Evaluation and Adjustment of Data	2020	<p>i. Examine and compare merits and demerits of various sources of population data</p> <p>ii. Understand the evaluation of data, factors affecting completeness of data</p> <p>iii. Reproduce knowledge on population projections, calculations and applications</p>
5.	PS – 105	Population Education and Extension	2020	<p>i. Examine the components of population education and create awareness on population education among the students</p>

				<p>and youth</p> <p>ii. Acquire skills to organize Extension Programmes in population education at school, college and Non formal educational levels</p> <p>iii. demonstrate training on population education methods and techniques in order to create awareness on population education</p>
6.	PS - 106	Human Values and Professional Ethics-I	2020	<p>i. Identify the concepts of ethics and its relation to religion, politics and environment</p> <p>ii. Memorize the different aspect of values and interpret the best skills in understanding the merits of value related aspects</p> <p>iii. Demonstrate to interpret crime and theories of punishment with special reference to acquire knowledge on Manu and Yajnavalkya</p>
7.	PS – 201	Migration and Multi Regional Demography	2020	<p>i. Explore the different types and trends in migration</p> <p>ii. Apply skills in measurement, causes and consequences of different migrations in different regions</p> <p>iii. Explore the theories and recommend suitable policies of migration</p>
8.	PS – 202	N.G.O Management & Field Work Orientation	2020	<p>i. Understand the role, importance and establishing of NGO</p>

				<ul style="list-style-type: none"> ii. Explore the sources of funding of NGO's at national and international level iii. Explore demographic data by working with individuals, groups and communities
9.	PS - 203	Statistical Methods	2020	<ul style="list-style-type: none"> i. Familiarize the basic statistical methods and its applications to demographic data ii. Demonstrate knowledge on methods and techniques of sampling iii. Acquire skills in processing of data with computer
10.	PS - 204	Population Sociology	2020	<ul style="list-style-type: none"> i. Examine the basic sociological concepts, and evaluate the relationship of sociology to other social sciences ii. Identify the social institutions, social change and socialization iii. Explore the sociological theories of fertility and its application in contemporary society
11.	PS - 205	Fundamentals of Social Work	2020	<ul style="list-style-type: none"> i. Memorize the basic concepts of social work and its nature and scope. ii. Recognize the different methods of social work iii. Explore the social work practice in different fields iv. Acquire knowledge on the evolution of social work in India v. Explore the professional associations and importance of networking in social work profession

12.	PS – 206	Human Values and Professional Ethics - II	2020	<ul style="list-style-type: none"> i. Acquire and gain knowledge on different concepts of human values and behavioural changes. ii. Recognizing the medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics of medical and health care professionals. iii. Acquire skills on environmental ethics and its relation to Health
13.	PS - 301	Population Geography	2020	<ul style="list-style-type: none"> i. Enumerate the geographical factors affecting the distribution of population ii. Awareness and understanding of trends in urbanization and its impact on ecological imbalance, global warming, greenhouse effects. iii. Able to assess changing pattern of land use, conservation of resources and critical thinking of policies, programmes for better management of environment
14.	PS - 302	Research Methodology	2020	<ul style="list-style-type: none"> i. Demonstrate in conducting population research and surveys ii. Prepare research design and apply sampling techniques iii. Discover skills in methods and tools of data collection, data analysis, interpretation, and report writing.
15.	PS - 303	Community Health	2020	<ul style="list-style-type: none"> i. Discover comprehensive knowledge on concepts of community health, illness, disease prevention

				<ul style="list-style-type: none"> ii. Critical thinking on epidemiology, communicable diseases and its prevention iii. Understand and appreciate the concepts of health, nutrition, balance diet, nutrition deficiency diseases and National Health Programmes
16.	PS – 304 a	Population Psychology	2020	<ul style="list-style-type: none"> i. Appreciate the scope of psychology and the relationship between value of children and fertility ii. Familiarize and comprehend the significant psychological theories relevant to fertility and contraceptive behavior iii. Demonstrate leadership and effective communication skills in promoting health and family planning
17.	PS – 304 b	Population Policies and Programmes	2020	<ul style="list-style-type: none"> i. Explore population policies related to fertility, mortality and migration ii. Acquire the knowledge on methods of family planning and acts relating to medical termination of pregnancy, age at marriage and also registration of vital events iii. Apply best practices and strategies for promoting family welfare programme.
18.	PS – 304 c	Gerontology	2020	<ul style="list-style-type: none"> i. Understand the scope of gerontology and demographic dimensions of the elderly ii. Critically explore and analyze changes in status of elderly health, problems and needs of elderly

				iii. Acquire skills in dealing elderly issues like neglect, abuse, violence and abandonment caregivers stress and elderly neglect
19.	PS – 304 d	Population and Sustainable Development	2020	<ul style="list-style-type: none"> i. Examine the concepts and theoretical issues relating to sustainable development and sustainable goals ii. Assess and measure the quality of life, resource creation, and management and distribution iii. Critically think of the relationship between population, environment, poverty and population sustainable growth
20.	PS-305 a	Principles of Population Studies	2020	<ul style="list-style-type: none"> i. Explore the components of population change, trends in size and growth of population ii. Discover the concepts of fertility, mortality and migration iii. Acquire skills in exploring the sources and quality of data on fertility, mortality and migration
21.	PS – 305 b	Population, Society and Environment	2020	<ul style="list-style-type: none"> i. Understand the components of population change and sociological consequences ii. Demonstrate sociological perspective to analyze the relationship between man, ecology and environment iii. Critical thinking of Sustainable development and its concepts
22.	PS - 401	Communication for Family	2020	<ul style="list-style-type: none"> i. Examine the elements in communication

		Welfare Programmes		<ul style="list-style-type: none"> ii. Understand and apply different approaches to communication iii. Critically analyze and apply factors influencing a various communication methods to promote family planning
23.	PS – 402	Reproduce Health and Adolescent Issues	2020	<ul style="list-style-type: none"> i. Examine the anatomy and physiology of human reproduction, conception and pregnancy ii. Describe the male and female reproductive health problems iii. Assess and examine various adolescent issues
24.	PS - 403	Population Growth and Development	2020	<ul style="list-style-type: none"> i. Understand the indicators of development with special reference to population growth and development. ii. Discover the concepts of economic inequality and its causes iii. Examine the status of women and development and demographic consequence of women empowerment
25.	PS – 404 a	Dissertation	2020	<ul style="list-style-type: none"> i. Develop in-depth knowledge of field work and community surveys ii. Acquire the skills to present and discuss the findings through seminars iii. Explore the skills in preparation and presentation of research findings
26.	PS – 404	Demography of Andhra	2020	<ul style="list-style-type: none"> i. Acquire knowledge on basic trends and

	b	Pradesh		<p>changes in population growth in Andhra Pradesh</p> <p>ii. Examine the migration and urbanization, problems of slums and related policies with special reference to Andhra Pradesh</p> <p>iii. Explore the population policies and programmes in Andhra Pradesh</p>
27.	PS – 404 c	Social Work in Industry and Human resource Management	2020	<p>i. Understand the concepts, principles and functions of Management</p> <p>ii. Acquire skills on difference process of Human Resource management</p> <p>iii. Demonstrate the organizational behavior, management conflicts and organization of interventions</p> <p>iv. Concepts of Industrial relations and related legislations for industrial workers</p>
28.	PS – 404 d	Health Economics	2020	<p>i. Explore the concepts in economics in relation to health and population dynamics</p> <p>ii. Acquire skills in assessing costing and health economics</p> <p>iii. Critically analyze and evaluate general health status and quality of life and also measurement of health outcomes</p>
29.	PS – 405 a	Rural, Urban, Tribal Development	2020	<p>i. Explore the characteristics of rural, urban and tribal community</p> <p>ii. Discover community development and experiment projects in rural, urban and tribal areas</p> <p>iii. Critically examine and understand the</p>

				issues related to rural, urban and tribal areas and approaches to community development
30.	PS – 405 b	Social policies and planning	2020	<ul style="list-style-type: none"> i. Discover social policies in relation to Indian constitution. ii. Examine the approaches to social policy iii. Demonstrate and analyze various social policies and their implementation

Masters in Social Work

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1.	MSW- 101	Sociology for Social Work	2020	<ul style="list-style-type: none"> i. Discover basic concepts in Sociology and examine the relation between individual and society. ii. Distinguish between Socialization, Social institutions and Social groups iii. Critically demonstrate , Social Stratification, Social Deviance, Social Change and Social Problems
2.	MSW - 102	Human Growth and Personality Development	2020	<ul style="list-style-type: none"> i. Memorize various stages of Human

				<p>Growth and Development</p> <ul style="list-style-type: none"> ii. Identify different concepts of Human Behavior like Motivation, Perception, Learning and Attitudes iii. Discover experience in assisting the person in Solving their Psycho social problems through personality development and adjustment
3.	MSW – 103	Social Work Profession & Field Work Orientation	2020	<ul style="list-style-type: none"> i. Recall various concepts like Social Service, Social Welfare, Social Development and Social Work ii. Experiment on Ethical Values of Professional Social Work and analyze current trends in Social Work iii. Design field work in Social Work and acquire skills to involve the client in problem solving process
4.	MSW 104	Social Work Practice with Individuals & Groups	2020	<ul style="list-style-type: none"> i. Recognize the basics Concepts , Techniques and Skills of case work

				<ul style="list-style-type: none"> ii. Apply different approaches of Case Work, Group Work iii. Evaluate the application of Social Case Work and Group Work at various settings like Schools, Hospitals, and Correctional Settings and in Communities.
5.	MSW – 105	Social Work Practicum - I	2020	<ul style="list-style-type: none"> i. Recognize the significance of Social Work in various settings ii. Illustrate the application of Social Work Methods in the agencies during their field practicum iii. Examine the applications of Social Work Principles and Skills in the functions of different organizational systems
6.	MSW - 106	Human Values and Professional Ethics-I	2020	<ul style="list-style-type: none"> i. Familiarize the concepts of ethics and its relation to Religion, Politics and Environment etc. ii. Able to gain knowledge on different aspect of Values and Interpret the best Skills in

				<p>understanding the merits of value related aspects</p> <p>iii. Discover to interpret Crime and Theories of Punishment with special reference to Manu and Yajnavalkya</p>
7.	MSW – 201	Social Work Profession & Field work Orientation	2020	<p>i. Recognize the Scope, Importance and Significance of Social Work Practice in different fields</p> <p>ii. Acquire Knowledge and Skills Essentials for Working with Groups and Communities</p> <p>iii. Formulate Capacity Building by organizing training and awareness programmes in the Field Work Settings</p>
8.	MSW – 202	Social Work Practice with Communities	2020	<p>i. Acquainted with advanced level of knowledge in Community organization and Social Work practice</p> <p>ii. Appraise various approaches in Community Organization and Current</p>

				<p>issues in Community Organisation</p> <p>iii. Organize community participation using PRA methods and techniques</p>
9.	MSW - 203	Social Action and Social Legislation for Social Work Practice	2020	<p>i. Distinguish the elements of Social action, Models and Process of Social Action</p> <p>ii. Connect the Social Legislations with Social Work Practice</p> <p>iii. Appraise Laws pertaining to Women, children and Aged in Social work practice</p>
10.	MSW - 204	Social Policy and Planning	2020	<p>i. Examine the nature and Approaches of Social Policy in the Socio-economic and political context</p> <p>ii. Assess the implementation of Social Welfare Policies in Education, Health, Women, Children and Environment</p> <p>iii. Examine the Role of Social Workers in Formulating , Planning and Implementation of Social Policies</p>
11.	MSW - 205	Social Work Practicum-II	2020	<p>i. Examine the Nature, Scope and Functions</p>

				<p>of the different Government and non-profit organizations agency at ground level</p> <p>ii. Trained to assist their supervisor with in the limitations of the agency</p> <p>iii. Equipped with Professional Skills and Techniques through practical exposure</p>
12.	MSW – 206	Human Values and Professional Ethics - II	2020	<p>i. Summarize different concepts of Human Values and Behavioural changes required for adjustment in Family and Society</p> <p>ii. Demonstrates Medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics in Medical and Health care professionals.</p> <p>iii. Acquire Skills on Environmental ethics and the Environment and Health</p>
13.	MSW - 301	Social Work Intervention with Families	2020	<p>i. Discover the Family Centered Practice as a Model of Social Work practice and understand Family life management and</p>

				<p>Family Dynamics</p> <p>ii. Demonstrate Family Assessment and Application of Tools : Interviewing , Ecological assessment – Eco map , Generation assessment- Genogram, Triangle, Family Sculpture and Family Mapping</p> <p>iii. Integrate social work practice with Families and Social Work Therapeutic Interventions wherever appropriate</p>
14.	MSW - 302	Social Work in the Field of Health	2020	<p>i. Examine the concept of Health, factors affecting health and Indicators of Health.</p> <p>ii. Evaluate Primary and Community healthcare services with special references to communicable and Non-communicable diseases</p> <p>iii. Assess the relevance, domains and nature of Social Work Intervention in different Health settings.</p>

15.	MSW - 303	Counseling in Social Work Practice	2020	<ul style="list-style-type: none"> i. Understanding the basics of Counseling and Approaches of Counseling ii. Develop ability to apply appropriate Counseling Techniques with Special Group iii. Demonstrate to apply Counselling Skills while working with clients in various settings like Health ,Family and School Settings
16.	MSW – 304 a	Social work Research	2020	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in Social Work Research process and Statistics ii. Illustrate single subject and evaluation Research Designs along with various Research designs iii. Facilitate methods of Sampling, Data Collection, Analysis, Statistical-Applications and Report Writing
17.	MSW – 304 b	Gerontological Social Work	2020	<ul style="list-style-type: none"> i. Identify theScope of Social Work in the field of Gerontology.

				<ul style="list-style-type: none"> ii. Illustrate Changes in the status of Elderly, Health problems and needs of Elderly. iii. Experiment the social work interventional strategies to Elderly ,Care givers and Counseling
18.	MSW – 304 c	Social Work Practicum-III	2020	<ul style="list-style-type: none"> i. Analysis the role of Community and dramatize the Community Organisation in field work practice ii. Develop skills and expertise their Field Work exposure to organize community programmes iii. Examine the new Intervention programs in the area of their specialization to bring a solutions to the problems in different community
19.	MSW – 304 d	Human Rights and Social Legislation	2020	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in Human rights ii. Distinguish various Social Legislations and Legislations related to Women and

				<p>Children</p> <p>iii. Nurture the Social Work Professionals by creating awareness on various current issues and related Legislations</p>
20.	MSW-305 a	Principles of Population Studies	2020	<p>i. Demonstrate the concept of Population Studies, Components of Population Change Population Structure</p> <p>ii. Interpret basic concepts and measures of Fertility, Mortality ,Mobility and Migration</p> <p>iii. Critically evaluate the Concept of Multi Regional Demography, its uses and limitations</p>
21.	MSW – 305 b	Fundamentals of Social Work	2020	<p>i. Examine basic concepts, Principles and Methods of Social Work</p> <p>ii. Defend values and Principles of Professional Social Work and Code of ethics for Social Workers</p> <p>iii. Evaluate Social Work Education in India, Professional Associations, Problems of</p>

				Professionalization and Networks in Social Work
22.	MSW - 401	Social Work Intervention with Children	2020	<ul style="list-style-type: none"> i. Examine the Significance and Development of Child Welfare Services with special reference to Child Rights ii. Appraise various Institutional and Non-Institutional services for children in need iii. Create Professional Knowledge on Social Work Intervention with children in difficult situations
23.	MSW – 402	Rural/Urban/Tribal Development & Empowerment –I	2020	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in rural Urban and Tribal community and Community Development Projects across the country ii. Trained to meet the challenges specifically related to Rural, Urban and Tribal communities iii. Will nurture the Social Work Professionals to become effective Social Worker and

				contribute to community by conducting awareness camps, strengthening Self-Help Groups and Facilitating Empowerment in the communities.
24.	MSW - 403	Social Work in the Field of Mental Health	2020	<ul style="list-style-type: none"> i. Understand the concept and importance of Mental Health and Psychiatric Social Work ii. Distinguish Psychiatric disorders and application of Therapeutic Interventions in Psychiatric Illness iii. Plan to provide Psychiatric Rehabilitation to assist Mentally Ill patients
25.	MSW – 404 a	Social Work in Industry & Human Resource Management	2020	<ul style="list-style-type: none"> i. Enrich knowledge on HRM, Personnel management, HR planning and ii. management systems iii. Appraise organizational behavior, conflict Resolution Strategies and Legislation related to industrial relations iv. Develop skills in Industrial Social Work

				Practice and the role and significance of Corporate Social Responsibility
26.	MSW – 404 b	Social Work Practicum-IV	2020	<ul style="list-style-type: none"> i. Acquires training in the organization as social worker and develop sound knowledge on social work which will motivate them to start an NGO ii. Evaluate projects and organize programmes for fund raising iii. Hypothesize research in their area of specialization through which they can suggest recommendations to agencies for improving quality
27.	MSW – 404 c	Social Work Practicum-V	2020	<p>Learn Skills and able to apply Principles during the Internship in Block Placement</p> <p>Explore research studies at Micro levels and submit reports as Mini Project Work</p> <p>Demonstrate as effective Social Worker in the agency in which they are placed</p>
28.	MSW – 404 d	Social Work and Disaster Management	2020	<ul style="list-style-type: none"> i. Summarize and understand the disasters

				<p>and Disaster Management</p> <p>ii. Acquire a critical perspective of the policy framework, Institutional Structures and programmes for Disaster Management in India</p> <p>iii. Explore Mental health consequences and able to provide Psychosocial care in Disaster Management</p>
29.	MSW – 404 a	NGO Management	2020	<p>i. Distinguish the Concept, Structure, Registration and By laws of NGOs</p> <p>ii. Demonstrate Organisational Management and source of funding of NGOs</p> <p>iii. Familiarize to organize Human Resource Management in NGOs</p>
30.	MSW – 404 B	Health Education	2020	<p>Discover the Roles, Responsibilities, Approaches and ethics in Health Education</p> <p>Describe the Behavioral, Environmental, and Genetic risk factors for Communicable and Non-communicable diseases.</p>

				Evaluate channels of Health education and organizational health set up at Central, State and District levels
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23. Sanskrit

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1	SNSKT-101	Elements of Darsanas-I	2020	An understanding of the evolution of Darsanas I.To create an awareness of the Darsanas ii.Acquire Knowledge of the Baudda and Jaina Darsanas iii.To get the Knowledge of Meemamsa Sastra
2	SNSKT-102	Vedic Texts-I	2020	I.Students able to get the Vedic knowledge II.Students know the importance of Vedic gods III.Students are understanding the Vedic chandas IV.To make understanding the spiritual knowledge through Kathopanishat
3	SNSKT-103	PROSE AND POETRY-1	2020	I.An understanding of evolution of Sanskrit poetry across the ages until the modern age II.Get the knowledge of gadya kavya III.Understand the poetical skills IV.Understand the importance of kiratarjuneeya in Sanskrit literature
4	SNSKT-104	DRAMA, ALANKARA AND	2020	Student will be able to get I.Understanding the features of Sanskrit drama

		PROSODY -1		<p>II.Knowledge of organ and development of Sanskrit dramas</p> <p>III.Understanding the efficiency of kalida's poetic skill.</p> <p>IV.Get the knowledge of chandas</p> <p>V.Get the knowledge of different types of chandas</p>
5	SANSKT1 05(A)	HISTORY OF SANSKRIT LITERATURE – 1	2020	<p>After completed of course the students are able to</p> <p>I.Know the origin and development of Sanskrit literature</p> <p>II.Know the importance of Vedas and its date.</p> <p>III.Know the meaning and contest of Brahmanas, Aranyakas and Upanishads</p> <p>IV.Know the social conditions as reflected in the Brahmanas</p> <p>V.Know the importance of Ramayana and its date</p>
6.	SANSKT :105(B)	DRAMA AND POETRY -1	2020	<p>I.Students will be able to gain understanding the features of Drama, Sentiment Moralities</p> <p>II.Through understanding the importance and place of Rasa in the Drama</p> <p>III.The knowledge about the skillfulness of Bhavabhutis Dramatergy</p> <p>IV.Recognize the transpiration of human experiences into dramatic experiences</p> <p>V.The knowledge about importance of Sandesa Kavyas in Sanskrit Literature</p>
7.	SANKT :105(C)	ALANKARA AND PROSODY - 1	2020	<p>I.Students will understand the different types of Alankara</p> <p>II.Know the importance of Alankara in the poetry</p> <p>III.Understand the development of on the basis of similar</p> <p>IV.Recognize the Guru and Laghu in prosody</p> <p>V.Know the importance of melogy through prosody</p>

8.	SANSKT: 106(A)	COMPARATIVE PHILOLOGY AND SIDDHANTA KOUMUDI- 1	2020	After complication of the course students are able to- I.Find out the main causes of semantic change II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing skills without grammatical mistakes..
9.	SANSKT:1 06 (B)	KAVYALANKARA SUTRA VRITTI -I	2020	I.Know the definition of poetry and prose II.Know the different types of Kavya III.Understand the different types of Riti IV.Understand the Pada and Padartha Doshas.
10.	SANSKT:1 07	HUMAN VALUES AND PROFESSIONAL ETHICS -I	2020	After completion of the course students are able to I.Understand Bhagavad Gita as a guide for modern life style II.Know the principles of Buddhism and Jainism III.Realize the necessary of practicing Human values and ethics in walks of life IV.Acquire the knowledge of Good and Bad V.Know the about crime and punishment according manu and Yajnavalkya
11	SANSKT – 201	ELEMENTS OF DARSANAS –II	2020	After completion of the course students are able to – I.Understand the knowledge of upamana and sabda pramanas II.Get the knowledge of Ayatharthanu Bhava III.Understand the Bahavana IV.Understand the Principals of Sankhya
12	SANSKT – 202	VEDIC TEXTS –II	2020	Students will know- I.The importance of Suktas II.The definition and purpose of Nirukta

				III.The meaning of Vedic words
13	SANSKT – 203	PROSE AND POETRY - II	2020	Students will able to get I.The beautification of prose literature. II.Enhancement of knowledge in appreciation of classical poetry III.Understanding about text that are selected. IV.Teaching skills in prose and poetry.
14	SANSKT – 204	DRAMA ALANKARA AND PROSODY – II	2020	Students will know I.The different characteristic features in Dramas II.The importance of nature and hermitages III.The features of Alankara and Classification of Alankaras IV.The knowledge of prosody
15	SANSKT – 205 (A)	HISTORY OF SANSKRIT LITERATURE –II	2020	After the completion of the course students are able to I.Know the features of Mahakavyas II.Know the structure of Drama and social message III.Know the moral values through the tales IV.Get the glance of classical Sanskrit literature
16	SANSKT – 205 (B)	DRAMA AND POETRY - II	2020	I.Get knowledge of good II.Know the character of Hero and Hero in etc., in the Drama III.Know the changes stories between original and creativeness IV.Know the importance skill fullness in poetry of Kalaidasa
17	SANSKT – 205 (C)	ALANKARA AND PROSODY - II	2020	I.Know the features and Examples II.Understand the different types of Uktis in Alankaras III.Know the difference between stuti and Ninda Alankaras IV.Get knowledge of sikharini and Mandakranta vrittas V.Know the definition and importance of Gayatri Matras

18	SANSKT - 206 (A)	COMPARATIVE PHILOLOGY AND SIDDHANTA KAUMUDI – II	2020	After completion of the course students are able to – I.Find out the main causes of semantic change II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing Skills without grammatical mistakes
19	206 (B)	KAVYALANKARA SUTRA VRITTI - II	2020	I.Know the difference between Guna and Alankara II.Ability to understand the theory of Riti III.To enable to understand the usage of Sabdalankaras IV.Know the contribution of Vamana to alankara sastra
20	SANSKT - 207	HUMAN VALUES AND PROFESSIONAL ETHICS - II	2020	I.Understand the relevance of value based education in modern society II.Understand the old traditions of medical ethics III.Understand the solutions of illegal and unethical practice IV.Understand the man and nature, Natural calamities and get the solution regarding those situations.
21	SANSKT :301	(Sahitya) RASAGANGADHARA, (ANANA.I) – I (IE)	2020	After the completion of the course students are able to I. Understand the Rasaswarupa II.Understand the purpose of Kavya and different types of Kavya III.Know the interpretations of Rasa sutras and ten types of Gunas IV.Know the Abhasas
22	SANSKT :302	DHVANYALOKA - 1	2020	on completion of the course students are able to I.Understand the Dhvani swarupam II.Understand the opinion of

				<p>Dhvanyabhavavadins</p> <p>III.Know the Dhavanikavya Lakshana</p> <p>IV.Know the Vyangya as Kavyatma</p> <p>V.Get the knowledge of splendid sastra Dhvanyaloka</p>
23	SANSKT :303-A	KAVYAPRAKASA AND DASARUPAKA- 1(IE)	2020	<p>Students will get -</p> <p>I.The knowledge of definition of kavya, types of kavyas</p> <p>II.The Knowledge about verities of vyangya</p> <p>III.The Knowledge of vyanjanaswarupa</p> <p>IV.An idea of ten types of Rupakas</p>
24	SANSKT:3 03-B	HISTORY OF SANSKRIT POETICS AND SANSKRIT ESSAY- I	2020	<p>On completion of the course students are able to</p> <p>I. Get the knowledge of sentence formation to write the essays on different issues</p> <p>II. Acquire the knowledge of Alankarikas</p> <p>III.Understand the different theories in Alankara sastra.</p> <p>IV.Understand the theory of Alankara and Rithi.</p>
25	SANSKT:3 03-C	Natyasastram Chapter I & VI only	2020	
26	SANSKT:3 03-D	Bhojaraja's Champu Ramayana (Balakanda only)	2020	
27	SANSKT:3 04	Personality Development in Panchatantra (Mitrabheda and Mitrapraptikam only)	2020	<p>.I.Know the losses arriving out of Non friend ship</p> <p>II.Know the world knowledge</p> <p>III.Achieving personality development through Panchatantra</p>
28	SANSKT:3	Introduction of	2020	

	05-A	Sanskrit language Infant Reader complete		
29	SANSKT:3 05-B	Raghuvamsam (Ist canto only)	2020	on completion of the course students are able to I.Understand the greatness of Sanskrit Language II.Know the greatness of poetry III.Get knowledge on panchamahakavya's after the epic literature IV.Get the knowledge about the kalidasas Natural and beautiful creations V.Understand the uses of upamalankara by kalidasa
30	SANSKT:4 01	(SAHITYA) RASAGANGADHA RA (ANANA-I)	2020	After completion of the course students are able to I.Know the number of Rasas in kavyas II.Know the uses of Rasa to elevate the situations in kavya III.Acquire the knowledge of Gunas and their role in Kavyas IV.Understand the differentiation of Bhava in Alankara sastra.
31	SANSKT :402	DHVANYALOKA – II	2020	Students will be able to get- I.The knowledge about different forms of schools II.Knowledge about the classification of Dhvani Siddhanta III.Knowledge regarding different alankara dhvanis IV.Know the difference between Rasadhvani and Rasavadalankara V.Know the main Rasa in Ramayana and Mahabharatha
32	SANSKT:4 03(A)	KAVYAPRAKASA AND DASARUPAKA–II	2020	After the completion of the course students are able to – I.Understand the structure of the Kavya II.Get the knowledge of Rasa and it's Bhedas

				<p>III.Find out the classification of Dhvani IV.Understand the Lakshana of Nataka V.Get the knowledge about 10 types of Nataka Bhedas</p>
33	SANSKRT:403(B)	HISTORY OF SANSKRIT POETICS AND SANSKRIT ESSAY-II	2020	<p>After the completion of the course students are able to – I.Get the knowledge of writing skills II.Acquire the knowledge of several Aesthetic poets like Mammata, Ruyyaka III.Understand the main theories on kavya of different poets IV.Get the knowledge of presentation skills on social related issues</p>
34	SANSKRT :403(C)	Kavyadarsa Chapter – I	2020	
35.	SANSKRT :403(D)	KavyaMeemamsa first to Eight Adhyayas	2020	
36.	SANSKRT :404	Introduction to Epigraphy and Manuscriptology	2020	<p>After the completion of the course students are able to I.Get the knowledge of inscriptions II.Acquire the knowledge of Brahmi and kharoshthi scripts III.Get the knowledge of writing materials in Ancient India IV.Get the knowledge of edition and critical edition of Manuscripts</p>
37.	SANSKRT :405 (A)	Hithopadesa of Narayanapandita Mitralabha and Mitrabheda	2020	<p>Students will be able to I.Get the moral values II.Understand the mentality of different kinds of people in the society III.Acquire the knowledge to behave a good citizen and a well</p>

				human being IV. Understand the message through neetikavya
38.	SANSKT :405(B)	Kautilya's Arthashastra Chapter – I (Vinayadhikarikam)	2020	

24. Sociology

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	MASO-101	Classical Sociological Theories	2020	<ol style="list-style-type: none"> 1. This paper seeks to expose the students to the classical thinkers and their contribution in building theoretical sociology. 2. To Compare and contrast the basic theoretical perspectives of sociology 3. To acquaint students with recent trends in Sociological thought.

2	MASO 102	- Sociological Research Methods and Statistics	2020	<ol style="list-style-type: none"> 1. This course aims to enable the students to understand the fundamental nature of the scientific approach towards social research and apply the skills in undertaking social research. 2. To equip the students with strategies of development for different segments of society. 3. To provide ways and means of understanding and studying social reality
3	MASO 103	- Indian Society and Inclusive Growth	2020	<ol style="list-style-type: none"> 1. This paper presents a comprehensive and integrated profile 2. To gain a better understanding of past and present structure and continuity of society 3. Identify and analyze the problems in Indian society and suggest solutions from sociological perspective
4	MASO 104	- Participatory Research	2020	<ol style="list-style-type: none"> 1. This paper is to inspire students to undertake research in partnership with stakeholders 2. To explain the emancipatory and empowering, collaborative and reflective approaches 3. To discuss the relationship between

				PRA and scientific method to incorporate the results to change the practice and policy.
5	MASO - 105	Principles of Sociology	2020	<ol style="list-style-type: none"> 1. This paper gives the students an understanding of the basic principles of Sociology as an academic discipline 2. To analyze the ways in which people interact and function in groups 3. It provides a basic knowledge on the fundamental aspects of the important social institutions
6.	MASO - 106	Human values and Professional Ethics - 1	2020	<ol style="list-style-type: none"> 1. To help students distinguish between values, skills, and understand the need, basic guidelines, content and process of value education 2. To provide Human Values and Ethics relating to Religion, Business, Law, Media and Environment 3. To provide an in depth knowledge about the Moral and ethical values for interpretation in their day to day life
7.	MASO - 201	Applied Sociology	2020	<ol style="list-style-type: none"> 1. To help students develop clear understanding of key concepts in classical and contemporary sociology

				<p>and how these concepts relate to some of the perennial themes in the discipline</p> <ol style="list-style-type: none"> 2. To develop an appreciation of the link between sociological theory and practice 3. To help students master the art of explaining abstract material in clear, precise ways that can be easily understood even by a lay man
8.	MASO - 202	Social Demography	2020	<ol style="list-style-type: none"> 1. To introduce the significance of population and its relation to society 2. To provide a theoretical knowledge of the basic concepts of population and changes 3. To enable the students to realize impact of population , changing global scenario, awareness on population control devices and analyse prospects
9.	MASO - 203	Rural Sociology and Development	2020	<ol style="list-style-type: none"> 1. This course is to help the students to understand the difference between urban and rural development 2. To analyse the dynamics of rural Indian society in the context of its socio, political and economic contradictions 3. To evaluate the problems related to development in relation to the needs

				and aspirations of the marginalized sections
10.	MASO - 204	Extension Work	2020	<ol style="list-style-type: none"> 1. This paper expose the students to apply sociological theories and principles in field areas 2. To give direct experience of social institutions and social problems through field work 3. To train for creative and innovative experiences in social field using research techniques
11	MASO - 205	Environmental Sociology	2020	<ol style="list-style-type: none"> 1. This paper aims to provide the students with a comprehensive conceptual, theoretical and empirical backgrounds of interaction between Social world and Nature 2. To explore the relationship between human society and the larger natural environment 3. To prepare the students for further research in broad areas of environment and natural resource governance from sociological perspective
12	MASO - 206	Human Values and Professional Ethics-II	2020	<ol style="list-style-type: none"> 1. To provide knowledge about Value oriented education, Medical ethics, Family values , Ethics and Moral code 2. To provide the Business,

				<p>Environmental and social ethics followed and practiced</p> <p>3. To enhance values of self-esteem and self-respect among students</p>
13	MASO - 301	Medical Sociology	2020	<p>1. This course will help the students to understand the concepts of health and illness</p> <p>2. To understand the social facts of health and the root causes of illness</p> <p>3. To apply sociological theories, concepts, and research to experiences of health, illness, health education, public health and the intense public issues related to health</p>
14	MASO - 302	Urban Sociology and Development	2020	<p>1. This paper attempts to analyse the urban social world and its dynamics, various theoretical constructs concerning the patterning and growth of towns and cities</p> <p>2. To understand the various theoretical approaches to urban development and apply them to different aspects of cities</p> <p>3. To study historical, economic, and political trends that have affected the growth and development of cities</p>
15	MASO - 303	Field Work and Extension (Village placement)	2020	<p>1. This paper aims at direct exposure of students to the real world and problems confronting society</p>

				<ol style="list-style-type: none"> 2. Students will carry out field work in village for 10 days for practical experience 3. To learn about sociological study techniques like Participatory Rural Appraisal, Sampling, Interview and Extension
16	MASO 304	Generic electives (a) Human Rights	2020	<ol style="list-style-type: none"> 1. To study Human rights and Constitutional framework 2. To recognize the role of human rights in development, theories of development, development and tradeoff on human rights 3. To Understand the social, political, cultural, and comparative construction of human rights history , institutions, discourses, and futures
		(b) Sociology of Gender	2020	<ol style="list-style-type: none"> 1. To examine how society influences understandings and perception of differences between masculinity (what society deems appropriate behaviour for a “man”) and femininity (what society deems appropriate behaviour for a “woman”). 2. To understand influences of gender on identity and social practices. 3. To pay special focus on the power relationships that follow from the

				established gender order in a given society and changes over time.
		c) Gerontology	2020	<ol style="list-style-type: none"> 1. This paper aims at understanding physical, psychosocial, and cultural aspects of the aged 2. To understand aging transitions and intergenerational issues at various contexts and its nexus 3. To examine health and illness adjusting to loss and care of persons with chronic illnesses and rehabilitative needs
		(d) Sociology of Andhra Pradesh	2020	<ol style="list-style-type: none"> 1. This paper aims to study the historical outline and emergence of Andhra society 2. To understand the culture and various social movements in Andhra Pradesh 3. To analyze the welfare and developmental programmes of the rural and urban Andhra Pradesh
17	MASO - 305	Open elective (a) Social Psychology and Personality Development	2020	<ol style="list-style-type: none"> 1. This paper aims at the understanding the relationship of cognition and attitudes of individual and society 2. To focus on psychological aspects of the individual in the context of social behaviour 3. To examine group dynamics such as group thinking and decision making, leadership, persuasion, conflict and

				cooperation)
		(b) Business And Society	2020	<ol style="list-style-type: none"> 1. This paper aims at understanding the concepts of Social economy and knowledge management 2. To examine the business community and social responsibility 3. To understand the inter-relation among business firms, organizations , public policy, business law and governance
23	MASO - 401	Criminology	2020	<ol style="list-style-type: none"> 1. This paper seeks to describe the students about the different types of crime and scope of criminology 2. To illustrate the causes of crime and crime rates 3. To study the crime scientifically through data on crime, trends and various theoretical approaches
24	MASO-402	Industrial Dynamics	2020	<ol style="list-style-type: none"> 1. This paper aims to provide the students about the structure and process of industrial organizations from sociological perspective 2. To deal with the effects of industrialization on Indian social systems and institutions 3. To study the internal relations which are connected directly or indirectly with industry

25	MASO-403	Field Work	2020	<ol style="list-style-type: none"> 1. This paper aims at exposing students in analysing the data 2. To understand the different variations in viva-voce 3. To understand the recent patterns in Practice
26	MASO-404	Generic electives (a) Social Welfare and Welfare Administration	2020	<ol style="list-style-type: none"> 1. This paper aims at understanding the efficiency of resources and services to meet the needs of the individuals, families, groups and communities 2. To understand the problems of Schedule castes, Schedule tribes, Backward classes and Minorities 3. To facilitate social relationship and adjustments necessary for the disadvantaged sections, children, women, youth and elderly
		(b) Social Entrepreneurship Development	2020	<ol style="list-style-type: none"> 1. The aim of this paper is to understand the theoretical positions of the Social entrepreneurship development 2. To be aware of the contemporary approaches to social entrepreneurship 3. To have comprehensive understanding of the context, process and effects of entrepreneurial activities
		(c) Sociological Perspectives	2020	<ol style="list-style-type: none"> 1. This paper aims at the students to compare and contrast basic theoretical

				<p>perspectives of sociology through rigorous scientific enterprise</p> <ol style="list-style-type: none"> 2. To sensitize the need for empirically grounded theories 3. To acquaint students with the recent trends in Sociological thought
		(d) Globalization and society	2020	<ol style="list-style-type: none"> 1. This paper aims at the students to understand the nature and dynamics of globalization and social context through various agencies 2. To analyze the interconnected changes in the economic, cultural, social, and political spheres of society 3. To understand ever-increasing integration of nations, regions, communities
27	MASO-405	Open elective (a) Globalization and Educational Pursuits	2020	<ol style="list-style-type: none"> 1. This paper aims to understand multifaceted nature of globalization and internationalization in the context of higher education 2. To examine key concepts and theories of globalization, international and comparative education 3. To make the students understand the Global citizenship from professional and academic perspective
		(b) Visual Sociology	2020	<ol style="list-style-type: none"> 1. This paper aims at providing the

				<p>students a new perspective in study of deliberate versus spontaneous behavior</p> <ol style="list-style-type: none"> 2. To be aware of recording social signals, expressions as spontaneous as possible 3. To organize the recording of reactions and variations that occur as a response to the context
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25. Tamil

26. Telugu Studies

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	TEL 101	Prescribed texts : classical poetry and drama	2020	<ol style="list-style-type: none"> 1. Understand the significance of Ancient Traditional and Classical Literature. 2. Understand the History and the Characteristics and the Practice of Epic Poetry. 3. Understand the Soci - Political, Cultural and Economic conditions of the ancient days. 4. Acquire Language Knowledge indepth.
2	TEL 102	General linguistics	2020	<ol style="list-style-type: none"> 1. Understand the General Linguistics. 2. Acquaint the Various branches of Linguistics. 3. Understand the Phonology, Syntax and Phonetics. 4. Understand the Services of Indian and Westren Linguists.

3	TEL 103	History of telugu literature - i	2020	<ol style="list-style-type: none"> 1. Understand that how to study the methods of History of Literature. 2. Understand the different works of various Poets in Classical Literature, Part - I 3. Understand the Political, Religious and Cultural Life Styles analysed in classical Literature, Part - I 4. Understand the various Genres in Classical Literature, Part - I
4	TEL 104	Grammar and prosody	2020	<ol style="list-style-type: none"> 1. Interpret, analyze, evaluate and respond to the ideas about classical Telugu Grammer. 2. Understand the aims and Characteristics of Classical Poetry and Grammar terminology. 3. Understand the concepts of some Parichhedas in Balavyakaranam. 4. Understand the aims and Features of Prosody in Classical Poetry.
5	TEL 105 A	Folk lore	2020	<ol style="list-style-type: none"> 1. Understand the Folk Literature and Folk Arts from Native Languages. 2. Understand with the rich legacy of Literature in Folk Arts and Cultural Artifacts 3. Understand with traditional performing Art Forms from Native rural life.
6	TEL 105	Sataka sahityamu	2020	<ol style="list-style-type: none"> 1. Understand the importance of Special

	B			<p>Genre ‘Sathakam’ and its divisions.</p> <p>2. Understand the Special features of Sathakam and its Origin and Evolution.</p> <p>3. Understand the Special Sathakas of Baddena, Marada Venkayya and Vemana.</p>
7	TEL 105 C	Special study : potana	2020	<p>1. Understand the importance of potana and the devotion in Bhagavatham.</p> <p>2. Understand the social Conditions during the time of Poet Pothana.</p> <p>3. Understand the ultimate goal of Life and the way of Life.</p>
8	TEL 106 A	Classical telugu literary genres	2020	<p>1. Understand to learn the relation between Literature and Genre.</p> <p>2. Understand the ancint genres and its Special features in Classical Telugu Literature</p> <p>3. Understand the different Genres and its Special features in Classical Telugu Literature</p>
9	TEL 106 B	Pada sahyam	2020	<p>1. Unverstand the Various Geners of Indigenous Literature.</p> <p>2. Understand the Desi Literature Preserved in the Form of Divers native cultures and races.</p> <p>3. Understand the musical compositions and writings of Annamayya, Saranagapani ect.</p>
10	TEL 107	Human values and professional ethics –i	2020	<p>1. Realize the necessity of practicing Human values and Ethics in all walks of</p>

				<p>life including the profession they opt for</p> <ol style="list-style-type: none"> 2. Understand Bhagavat Gita as a guide for modern lifestyle. 3. Understand thought of Jainism and its necessity in contemporary living. 4. Understand the principles of Buddhism for a better living. 5. Understand the punishments given in Manu Smuriti for a comparison with modern punishments.
11	TEL 201	Prscribed texts : modern peotry	2020	<ol style="list-style-type: none"> 1. Understand the significance of Modern Poetry. 2. Understand the Socio - Political Cultural and Economic conditions of the Modern Days. 3. Understand the Modern and Contermporary Trends in Telugu Poetry. 4. To acqire the Knowledge of Present Social - Scenario in depth.
12	TEL 202	Evolution of telugu language	2020	<ol style="list-style-type: none"> 1. Understand the origin of Various Telugu Dialectts. 2. Understand the Practicality of the need of Standard Language in Using Various fields. 3. Understand to undertake Research in the Various aspects of Telugu Dialects.
13	TEL 203	History of telugu literature - 2	2020	<ol style="list-style-type: none"> 1. Understand the Political, Religious and

				<p>Cultural life styles of various Ages in later part of Classical Literature.</p> <p>2. Understand the reasons to establish the Modern Age in Telugu Literature.</p> <p>3. Understand some of the modern trends in the History of Telugu Literature.</p>
14	TEL 204	Grammar and poetics	2020	<p>1. Understand the Knowledge of Classical Telugu Grammar.</p> <p>2. Understand the Grammatical Terms particularly in Bala Vyakaranam.</p> <p>3. Understand the Various Alankaras in Telugu Literature.</p>
15	TEL 205 A	Rayalaseema sahityam	2020	<p>1. Understand the Historical and Geographical back - ground of Rayalaseema.</p> <p>2. Understand the Special Culture and Dialect of Rayalaseema.</p> <p>3. Understand the ancient and modern Literature of Rayalaseema in Different Genres</p>
16	TEL 205 B	Comparitive literature	2020	<p>1. Understand the Origin and the development of Comparitive study</p> <p>2. Understand the various aspects of Comparitive study in various genres like Poetry. Novel and Short Story</p> <p>3. Understand the comparitive aspects of south Indian Languages</p>

17	TEL 205 C	Special study : Potuluri veera brahmam	2020	<ol style="list-style-type: none"> 1. Understand the importance of Pothuluri Veerabrahman and his thoughts from his Literature. 2. Understand the social Conditions during the period of Pothuluri Veerabrahmam. 3. Understand the ultimate goal of life and the way of philosophical Life
18	TEL 206 A	Modern telugu literary genres	2020	<ol style="list-style-type: none"> 1. Understand the modern Telugu poetry, Novel and Short Stories. 2. Understand the major Trends in Modern Telugu Literature. 3. Understand the influence of western Literature on Modern Telugu Literature
19	TEL 206 B	Samsthana sahityam	2020	<ol style="list-style-type: none"> 1. Understand the Samstaanas and its histories in Telugu States. 2. Understand the major poets and writers and their writings of various Samstaanaas. 3. Understand the placement Telugu Literature.
20	TEL 207	Human values, professional ethics - ii	2020	<ol style="list-style-type: none"> 1. Understand the Human Values and relevance to present day. 2. Understand the Medical ethics in all aspects. 3. Understand the Business ethics to avoid immoral and illegal practices. 4. Understand the Social ethics in all aspects.

21	TEL 301	Classical literary criticism	2020	<ol style="list-style-type: none"> 1. Understand the Literary Criticism 2. Understand the Origin and Development of various theories like Rasa, Dhvani ect. from Indian Alankara Sastras. 3. Understand the earlier methods of Criticism in Telugu Literature. 4. Understand the definitions and uses of Kavyas by Indian and Westren Critics.
22	TEL 302	Telugu culture	2020	<ol style="list-style-type: none"> 1. Understand the Geographical and Historical importance of Andhra. 2. Understand the evolution of Andhra Culture since Satavahana period. 3. Understand the Customs and Practices of Andhra Life.
23	TEL 303 A	Telugu journalism	2020	<ol style="list-style-type: none"> 1. Understand the system of Mass Communications, its origin and development since ancient days. 2. Understand the different channels of Communications, and the role of Communications in Various fields like Socio - Political, Economic, Scientific, Cultural ect. 3. Understand the importance of Communications in personality development and employment opportunities
24	TEL 303	Modern telugu literature	2020	<ol style="list-style-type: none"> 1. Understand the modern Telugu poetry,

	B			<p>Novel and Short Stories,</p> <p>2. Understand the students with the major Trends and Social Movements in Modern Telugu Literature.</p> <p>3. Understand the students to know the influence of westren Literature on Modern Telugu Literature.</p>
25	TEL 303 C	Telugu feministic literature	2020	<p>1. Understand the emerging trends of Feminism across the world</p> <p>2. Understand the origin and development of Ferminism movements in Telugu Literature</p> <p>3. Understand the concepts such as Patriarchy, Gender discrimination, lingustic, Oppression in Socio-Political and economic spheres in the Feminist writings.</p>
26	TEL 303 D	Special study : gurajada apparao	2020	<p>1. Understand the importants of Gurajada and the devotion of Nation, Humanism in his writ ings.</p> <p>2. Understand the Special Conditions during the time of Gurajada.</p> <p>3. Understand the responsiblity in Construction of Modern Society.</p>
27	TEL 304	Personolity development & language skills	2020	<p>1. Understandius soft skills, types of soft skills and intrapersonal skills.</p>

				<p>2. Exhibiting different type of people skills.</p> <p>3. Demonstrating oral communication skills through effective presentations.</p> <p>4. Exhibiting various modes of written communication.</p> <p>5. Developing employability skills.</p>
28	TEL 305 A	Introducation of telugu literature	2020	<p>1. Understand all Literory Ages from before Nannaya to modern period.</p> <p>2. Understand the major Poets and their works in Telugu Literature.</p> <p>3. Understand the major Trends in Telugu Literature.</p> <p>4. Understand the various Genres in Classical and Modern Telugu Literature.</p>
29	TEL 305 B	Fundamentals of modern Telugu language	2020	<p>1. Understand the primary features of Telugu Language.</p> <p>2. Understand the Various Forms like Noun, Pronoun ect. in Telugu Language.</p> <p>3. Understand the Syntax of Telugu and Translation.</p> <p>4. Understand the Various types of Writings in Telugu.</p>
30	TEL 401	Modern telugu literary criticism	2020	<p>1. Understand the Modern Literary Criticism in Telugu.</p> <p>2. Understand the Various approaches in Western Literary Criticism.</p> <p>3. Understand the impact of Western Literary Criticism on Telugu Criticism.</p>

				4. Understand the features of various Telugu Genres in a Critical way.
31	TEL 402	Sanskrit literature and grammar	2020	<ol style="list-style-type: none"> 1. Know about the most ancient Language in the world, Sanskrit. 2. Understand the Glory and importance of Sanskrit Literature and Grammar. 3. Understand the Vedic literature, and other Ancient Genres in Sanskrit.
32	TEL 403 A	Translation methods	2020	<ol style="list-style-type: none"> 1. Unverstand the different tools, techniques, and methods of Translation. 2. Understand the problems and challenges in translation 3. Understand to learn translations as a bridge not only between two Languages but also be tween two cultures.
33	TEL 403 B	Research methodology	2020	<ol style="list-style-type: none"> 1. Understand the importance of research work 2. Understand how to take the Research Topic 3. Understand that how many methods to get information regarding the research work.
34	TEL 403 C	Telugu dalith literature	2020	<ol style="list-style-type: none"> 1. To enable the students to learn the origin and the development of caste system in India. 2. To introduce the students to the Indian social Darsanaas like Charvaka, Jaina and Boudha.

				3. To acquaint the students with Dalith Literature in Telugu, some Social events and some of the major Dalith Poets and writers.
35	TEL 403 D	Indian literature	2020	<ol style="list-style-type: none"> 1. familiarise with defferent religions schools of Modran Literature. 2. acquaint with different movements and trends is Indian Literature. 3. acquaint with comparitive aspects of different Genres is Indian Literature
36	TEL 404	India : philosophical, aesthetical, Socialological & historical studay	2020	<ol style="list-style-type: none"> 1. to introduce the students the knowledge of Various schools of ancient Indian Phylosophy to understand the Indianism. 2. To inculcate the students the back ground of some Historics, Sociological movements to understand class & caste systems in India. 3. To gain the students the lamparatric Knowledge of Indian Literatures.
37	TEL 405 A	Fundamentals of folk lore	2020	<ol style="list-style-type: none"> 1. Understand the Folk Literature as a popular Art Form in native Languages. 2. Understand the rich legacy of Literature in Folk Songs, Folk Performing Arts and other Cultural Artifacts. 3. Understand the traditional Values, belifs, customs and devotional methods on rural

				Goddess ect.
38	TEL 405 B	Telugu nataka sahyam	2020	1. Understand the importance of Special Genre 'Natakam' and its features. 2. Understand the stages in evolution of 'Natakam' 3. Understand the difference between Natakam (play) and Natika (Play let) by Studying some 'Natakas' and 'Natikas'.

27. Urdu

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	URD 101	Mubadiyat-e-Lisaniyat aur Tareeq-e-Zaban-e- Urdu	2020	Course Outcomes: (1) Knowledge of history of basic Urdu Language. (2) Awareness about ancient and modern Indo-Aryan
2.	URD 102	Dakniyat	2020	Out come (1) Student understands the brief history of Dakani Literature. (2) Student will be able to analyses the writings of
3.	URD 103	Classiki Nasr	2020	Course Outcomes: (1) Student will be able to understand the early Urdu poetry of Northern India. (2) Understanding the different forms of Urdu Poetry

4.	URD 104	Arabi Zaban-o-Adab	2020	<p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of humor and satire in Urdu literature.</p> <p>(2) Differentiate between satire and humor in text.</p>
5.	URD 105	Fanne Sher aur Jadeed Asnafa Shairi	2020	<p>Course Outcomes:</p> <p>(1) Able to read, write and understand simple Arabic sentences.</p> <p>(2) Translate simple Arabic sentences.</p> <p>(3) Student will gain brief awareness of Arabic literature</p> <p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of Urdu Qaseeda from Dakani period.</p> <p>(2) Differentiate between the Dakani and Urdu Qaseeda with respect of language, diction and style</p> <p>(3) Understand the salient features of Urdu Qaseeda</p>
6.	URD 106	Human Values and Professional Ethics – I	2020	<p>Course Outcomes:</p> <p>(1) Knowledge about tradition of Urdu Drama.</p> <p>(2) Distinguish various forms and techniques of Urdu Drama.</p> <p>(3) Analyses critically the text of Anar kali and Inder Sabha.</p> <p>Course Outcomes:</p> <p>(1) The student would enrich the knowledge about the</p>
7.	URD 107		2020	<p>Course Outcomes:</p> <p>(1) Understand, What are the Human Values accepted globally.</p>
8.	URD 201	Rayalaseema ka Sher-o-Adab	2020	<p>Course Outcomes:</p> <p>(1) Have learn about the important historical events of Urdu Poetry.</p>

9.	URD 202	Classiki Shairi	2020	<p>Out come</p> <p>(1) Student understands the brief history of Dakani Literature.</p> <p>(2) Student will be able to analyze the writings of Mohd Ouli Outub Shah.</p>
10.	URD 203	Hali : Hayat aur Adabi Khidmat	2020	<p>Out come</p> <p>(1) Student will know about the classics of Urdu prose.</p> <p>(2) Student will be able to read and understand the text.</p> <p>(3) Student will learn critical awareness of the text.</p>
11.	URD 204	Farsi Zaban-o-Adab	2020	<p>Out come</p> <p>(1) Student will know about the classics of Urdu prose.</p> <p>(2) Student will be able to read and understand the text.</p> <p>(3) Student will learn critical awareness of the text.</p>
12.	URD 205	Ghair Afsanavi Adab	2020	<p>Course Outcomes:</p> <p>(1) Student will be able to read, write and understand simple persian sentences.</p> <p>(2) Acquire Knowledge about the Persian poetic writings of Sa'di, Hafiz and Iqbal.</p> <p>(3) Student will gain brief awareness of Persian literature.</p> <p>Course Outcomes:</p> <p>(1) Specialized in the life and contributions of Faiz Ahmed Faiz.</p> <p>(2) Identify the uniqueness of the poetry of Faiz Ahmed Faiz.</p> <p>(3) Understanding the salient features of the poetry of</p>

13.	URD 206 206	Human Values and Professional Ethics –II	2020	<p>Course Outcomes:</p> <p>(1) Awareness of literature written in Rayalaseema. (2) Understand the style of new poets of this region. (3) Gain knowledge about two of the prominent prose writers of this area</p> <p>Course Outcomes:</p> <p>(1) Analyze the style of the prominent prose writers of this area</p>
14.	URD 207		2020	<p>Course Outcomes:</p> <p>(1) Awareness about Professional Ethics and its categorization. (2) Understand the importance of Professional Ethics in</p>
15.	URD 301	Jadeed Nasr	2020	<p>Course Outcomes:</p> <p>(1) Knowledge about the forms and tradition of Urdu Ghazal. (2) Understanding Dakani Ghazal with reference to</p>
16.	URD 302	Jadeed Nazm	2020	<p>Out comes</p> <p>(1) Understanding the forms of Urdu Nazm. (2) Critically estimate and explain the art and technique of famous Urdu poets.</p>

17.	URD 303	Urdu Tanqeed	2020	<p>Out come</p> <p>(1) The learner would understand about the mile stones of Urdu Novel.</p> <p>(2) The learner would understand the technical features of Urdu Novel.</p> <p>(3) The learner would understand about the Urdu Novel writers.</p> <p>Out come</p> <p>(1) Knowledge about tradition of Urdu Afsana.</p> <p>(2) Awareness of literary trends and its impact on Urdu Afsana.</p> <p>(3) Identifying and distinguishing the elements in Urdu Afsana</p> <p>Course Outcomes:</p>
18.	URD 304 A URD 304 B URD 304 C	(a) Sir Syed ka Khusoosi Mutalea (b) Iqbal ka Khusoosi Mutalea (c) Faiz ka Khusoosi	2020	<p>Course Outcomes:</p> <p>(1) The learner will know about the aims and objectives of the Journalism.</p> <p>(2) Distinguish between writings of news paper, radio and television.</p> <p>(3) The learner will know about the different fields of Urdu journalism.</p>
19.	URD 305 A URD 305 B URD 305 C	(a) Urdu Ghazal (b) Jadeed Dakani Shairi (c) Urdu Afsana	2020	<p>Course Outcomes:</p> <p>(1) Knowledge about Jadeed Dakani Shairi.</p> <p>(2) Understand Jadeed Dakani Shairi and its vocabulary and diction.</p> <p>(3) Critical awareness about 5 eminent poets of Jadeed Dakani.</p> <p>Course Outcomes:</p> <p>(1) Knowledge about types, techniques and issues of translation.</p>

20.	URD 401	Urdu Drama	2020	<p>Course Outcomes:</p> <p>(1) Knowledge of Basic Linguistics. (2) Awareness about ancient and modern Indo-Aryan languages.</p>
21.	URD 402	Adabi Tehreekat aur Rujhanat	2020	<p>Out comes</p> <p>(1) Knowledge about research, types of research and method of research. (2) Distinguish between various types of research writings.</p>
22.	URD 403	Tanz –o- Mizah	2020	<p>Out come</p> <p>(1) Knowledge about Literary criticism. (2) Vies and contributions of Hali and Shibli on literary criticism. (3) Understanding 6 schools of literary criticism.</p> <p>Out come</p> <p>(1) Understand the tradition of Ghari Afsanavi Adab and its salient features. (2) Literary importance of Maktoob Nigare and Inshaiya. (3) Literary importance of Khaka and Safarnama.</p> <p>Course Outcomes:</p> <p>(1) Understand the literary contributions of Altaf Husain Hali. (2) Importance and salient features of Mussadas.</p>
23.	URD 404 A URD 404 B URD 404 C URD 404	(a) Urdu Tarjuma Nigari (b) Urdu Marsiya	2020	<p>Outcomes:</p> <p>(1) Able to know the history and trends of Telugu, Hindi and English languages. (2) Gain the comparative knowledge of various languages and their literature</p>

24.	URD 405 A URD 405 B URD 405 C	(a) Ibtdayi Urdu (b) Tehqeeq - Tariqekar (c) Urdu Qaseeda	2020	Course Outcomes: (1) Specialized in the contributions of Sir Syed Ahmed Khan. (2) Contributions of Sir Syed Ahmed Khan, as literary person and as a educationist. (3) Understanding the contributions of his literary friends Course Outcomes:
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S.V.U. College of Sciences

28. Anthropology

S. No.	Name of the Programme	Course Code	Title of the Course	Years	Course Outcomes
1	M.Sc. Anthropology	ANO : 101	Introduction to Biological Anthropology	2020	<ul style="list-style-type: none"> a. Exposed to the basic concept, meaning and scope of Biological Anthropology b. Explain how human being acts as the central figure of Anthropology c. Elucidate the major divisions of Biological/ physical Anthropology d. Know the inter-relationship between Biological Anthropology and other sciences e. To know how Man evolved in animal kingdom

					f. To understand how evolution has occurred and what are the evidences of evolution and addresses human variation and the causes of variations
2	M.Sc. Anthropology	ANO : 102	Introduction to Social Cultural Anthropology	2020	<ul style="list-style-type: none"> a. Exposed to the basic introductory background about Socio-cultural Anthropology, its historical background and relation to other branches b. Provides knowledge about the entire subject matter of the socio-cultural anthropology as well as its different sub-branches. c. Exposed to social institutions d. Know the religion beliefs, rituals and myth
3	M.Sc. Anthropology	ANO-103	Introduction to Archaeological Anthropology	2020	<ul style="list-style-type: none"> a. Able to define archaeological anthropology and its branches b. Understand the geological timescale, tool typology and technology c. The Course will explain the basic concepts and terminology used in prehistoric archaeology

					d. Understand chronological and cultural determinants of Indian and European prehistory
4	M.Sc. Anthropology	ANO-104	Indian Anthropology	2020	<ul style="list-style-type: none"> a. Exposed to diversified linguistic, Political , ethnic, communal and religious tensions and conflicts national integration. b. Understand the social structure and lifecycle patterns of different past societies c. Understand the caste and varna systems. Learn the major contributions of different Indian Anthropologists to Anthropology
5	M.Sc. Anthropology	ANO-105	Social Problems and Anthropology	2020	<ul style="list-style-type: none"> a. Exposed to eco-systems, symbiosis and homeostasis. b. Know about the shifting cultivation and ecological in balance c. Understand the problems and perspectives of Indian peasantry d. Understand the family, Kinship and caste system in India
6	M.Sc. Anthropology	ANO 106	Economic and Political Anthropology	2020	<ul style="list-style-type: none"> a. Able to learn meaning and scope of economic anthropology

					<ul style="list-style-type: none"> b. To understand the division of labor by gender and age, exchange of goods and gifts, and to understand the market economy. c. Able to know the historical background of Political Organization besides types and trends of Political Organization including types like i.e. Band, Tribe, Chiefdoms and State d. To know the local institutions: panchayats (traditional and statutory)
7	M.Sc. Anthropology	ANO 107	Human Ecology	2020	<ul style="list-style-type: none"> a. Exposed to the various ecological settings of human habitat . b. Know the ecological evaluation and adaptation. c. To understand the growth and development in various eco-systems d. Understand the Differential Fertility and Mortality, Survival Indices, quality of Life and Fitness.
8	M.Sc.	ANO 108	Tribal Development in India	2020	<ul style="list-style-type: none"> a. Exposed to the various

	Anthropology				<p>constitutional safeguard for schedule tribes.</p> <p>b. To understand the various tribal sub planes.</p> <p>c. To know the National Commission for STs, Tribal Advisory Council, Tribal Welfare Department</p> <p>d. To understand the implementation of developmental initiatives</p>
9	M.Sc. Anthropology	ANO 201	Comparative Ethnography and Indian Anthropology	2020	<p>a. To understand the major ethnological regions of the world</p> <p>b. To know the ethnic and linguistic classifications</p> <p>c. Able to understand the traditional Indian culture</p> <p>d. To know the contributions of Indian anthropologists</p>
10	M.Sc. Anthropology	ANO 202	Principals of Genetics	2020	<p>a. understand about the scope of genetics and its historical development</p> <p>b. to learn the biology of cell and cell division</p> <p>c. Exposed to the patterns of the inheritance</p> <p>d. Know about blood groups and their anthropological</p>

					perspective
11	M.Sc. Anthropology	ANO203	Prehistoric India	2020	<ul style="list-style-type: none"> a. learn the regional distribution of lower, middle, and upper Paleolithic cultures b. To learn the Mesolithic culture and typo- technology c. Learn the regional distributions of Neolithic cultures d. understand the copper and iron age e. exposed to the distribution of megaliths
12	M.Sc. Anthropology	ANO204	Urban Anthropology	2020	<ul style="list-style-type: none"> a. Exposed to the history of urbanization. b. Understand the environment and ecological processes of urban c. Understand the urbanization and industrialization on cultural complexity d. Understand the relevance of anthropology to urban industry, Business and Corporate Sectors; Urbanization and Social Change in India.
13	M.Sc. Anthropology	ANO205	Fieldwork Traditions	2020	<ul style="list-style-type: none"> a. Exposed to the various field work approaches.

					<ul style="list-style-type: none"> b. Know the ethnography, case study and survey methods. c. To understand the participatory rural appraisal (PRA) in India d. Understand the developmental tourism,.
14	M.Sc. Anthropology	ANO 206	Research Methods in Anthropology	2020	<ul style="list-style-type: none"> a. To understand the fieldwork traditions in Anthropology b. To understand the concept of research and its purpose c. highlight the conceptual structure of a research design d. understand the various statistical tools in the analysis and interpretation of the data
15	M.Sc. Anthropology	ANO 207	Biology, Health and Disease	2020	<ul style="list-style-type: none"> a. Exposed to the reproductive health problems and its impact women's health b. To know the Balanced diet, malnutrition, under nutrition Nutritional status and susceptibility to infectious diseases c. Learn about different diseases due to pollution and health hazards d. Understand the problems of

					ageing and longevity in India.
16	M.Sc. Anthropology	ANO 208	Early Civilizations	2020	<ul style="list-style-type: none"> a. Understand the Factors Contributing to the Emergence of Civilization and Urbanization. b. To Know about the Indus valley civilizations. c. Exposed to early civilizations of west Asia d. To know the early civilizations in China, South east Asia and in new world.
17	M.Sc. Anthropology	ANB 301	Human Evolution and Fossil Evidence	2020	<ul style="list-style-type: none"> a. Understand the evolutionary trends of primates, prosimians to homosapiens b. To know the hominid evolution c. To know the Neanderthals distributions and extension d. Exposed to the homo sapiens distribution and feature of human species
18	M.Sc. Anthropology	ANB 302	Human Genetics	2020	<ul style="list-style-type: none"> a. understand the meaning and scope of human genetics b. know methods of studying

					<p>human chromosomes and chromosomal abnormalities</p> <p>c. depict Inborn errors of metabolism with typical examples and human human ABO blood group system and its fundamentals</p> <p>d. know the concept of “one-gene-one-enzyme hypothesis” which explains development of genetic diseases/disorders caused by defective genes controlling the functions of enzymes in metabolic pathways</p>
19	M.Sc. Anthropology	ANB 303	Anthropological Demography	2020	<p>a. Know about the different population growth theories</p> <p>b. Learn the basic demographic variables</p> <p>c. Understand how the different factors regulates the population growth</p> <p>d. Understand the different demographic models</p> <p>e. Learn the genetic consequences of family planning</p>
20	M.Sc. Anthropology	ANB 304	Forensic Anthropology	2020	<p>a. able to know about forensic anthropology, a specialized, applied branch of</p>

					<p>physical/biological anthropology which deals with the crime investigation</p> <ul style="list-style-type: none"> b. understand how dermatoglyphic, somatoscopic characteristics and body fluids helpful in crime investigation c. know the use of skeletal remains in forensic investigations d. know the importance of modern methods in crime investigation
21	M.Sc. Anthropology	ANB 305	Epidemiology and Public Health	2020	<ul style="list-style-type: none"> a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health. b. Understand the global burden of health outcomes and diseases by assessing measures and interpret the prevalence, risk, rate, and odds within the context of epidemiology c. Know about Complications of obesity on health its prevention and control d. Understand the complex web of biological, behavioral, cultural and environmental factors towards the prevalence of

					communicable infections and chronic infections
22	M.Sc. Anthropology	ANB 307	Biostatistics and Computer Applications	2020	<ul style="list-style-type: none"> a. To understand the concept of research and its purpose b. To enlighten the process of research and conceptual structure of a research design c. Understand the disease outcomes through measurement of descriptive, analysis of variance and regression models through computer applications d. Know the use of computers in the analysis data and power point presentation
23	M.Sc. Anthropology	ANB 308	Palaeoanthropology	2020	<ul style="list-style-type: none"> a. understand the geological time scale and Pleistocene epoch b. know about tool making techniques and tool types c. gain knowledge about dating methods d. learn about Paleolithic, Mesolithic and Neolithic cultures in India
24	M.Sc.	ANB 309	Fundamentals of	2020	<ul style="list-style-type: none"> a. Understand the meaning, scope

	Anthropology		Anthropology		<p>and relation with other branches of Biological Anthropology.</p> <p>b. Understand the meaning, scope and relation with other branches of Socio-Cultural Anthropology.</p> <p>c. Understand the meaning, scope and relation with other branches of Archeological Anthropology</p> <p>d. Exposed to race, ethnicity and racial classification</p>
25	M.Sc. Anthropology	ANB 401	Biological Anthropology	2020	<p>a. Understand the basic concept, meaning and scope of Biological Anthropology</p> <p>b. Know the biological variation in modern human populations</p> <p>c. Understand the human adaptability and impact of urbanization on humans</p> <p>d. Bio-cultural aspects of health and disease</p>
26	M.Sc. Anthropology	ANB-402	Human Population Genetics	2020	<p>Students will</p> <p>a. Explain the basic terms/concepts of human population genetics</p> <p>b. Appreciate the mechanisms of evolutionary forces in shaping biological diversity</p> <p>c. Understand the importance of</p>

					<p>Hardy –Weinberg Equilibrium especially the gene frequency changes with respect to Mutation, Genetic drift, Selection, Gene flow and to investigate them in empirical situations in human populations</p> <p>d. Know about breeding isolation and its implications in human population genetics.</p> <p>e. Understand various mating patterns (inbreeding and types of consanguineous marriages) and measure the inbreeding in families</p>
27	M.Sc. Anthropology	ANB -403	Human Growth, Physique and Nutrition	2020	<p>a. Know about the Differentiate the term growth, maturation and development</p> <p>b. To learn the methods of studying growth and the factors affecting the growth</p> <p>c. To understand the Human Physique and its Relation of Function, Disease and Behavior.</p> <p>d. Know the socio-cultural aspects of nutrition and nutrients in health and diseases</p>
28	M.Sc. Anthropology	ANB -404	Applied Anthropology	Biological 2020	<p>a. Know about various applications of anthropometry</p>

					<p>and kinanthropometry in various fields</p> <p>b. Understand about the importance of forensic anthropology in crime investigations</p> <p>c. Know the importance genetic counseling, genetic screening, Genetic engineering, treatment of genetic diseases and Gene therapy</p> <p>d. Learn about the human geno project</p>
29	M.Sc. Anthropology	ANB -405	Medical Genetics	2020	<p>a. Understand the overplanting areas of anthropology and genetics, anthropology and medicine (Disease)</p> <p>b. Understand the different methods of identification genetic diseases</p> <p>c. Know about epidemiology, socio cultural and ecological dimensions of genetic diseases control and treatment Learn the knowledge, attitude and currying practices of genetic diseases</p>
30	M.Sc. Anthropology	ANB-408	Epidemiology	2020	<p>e. Exposed to the basic concepts in epidemiology with examples of</p>

					<p>epidemiology in different areas of public health.</p> <p>f. Understand the global burden of health outcomes and diseases by assessing measures and interpret the prevalence, risk, rate, and odds within the context of epidemiology</p> <p>g. Know about Complications of obesity on health its prevention and control</p> <p>h. Understand the complex web of biological, behavioral, cultural and environmental factors towards the prevalence of communicable infections and chronic infections</p>	
31	M.Sc. Anthropology	ANB -409	Applied Anthropology	Biological	2020	<p>e. Know about various applications of anthropometry and kinanthropometry in various fields</p> <p>f. Understand about the importance of forensic anthropology in crime investigations</p> <p>g. Know the importance genetic counseling, genetic screening,</p>

					Genetic engineering, treatment of genetic diseases and Gene therapy h. Learn about the human geno project
32	M.Sc. Anthropology	ANS 301	Theories of Culture	2020	a. Understand the Conceptual Contributions of E. B. Tylor, B. Malinowski, A. L. Kroeber, L. White, Unilineal Evolution (L. H. Morgan and E. B. Tylor); Multilineal Evolution (J. Steward); Universal Evolution (L. White) b. To know the British School; German-Austrian School; American – Distribution School of culture c. Know the Patterns of Culture (R. Bendict); Basic Personality, Model Personality (Kardiner, Linton, Cora Dubois); Selfhood (Murphy); Symbolic (G. Obeysekere) d. understand the historical approaches of culture
33	M.Sc. Anthropology	ANS 302	Social Anthropology of Complex Societies	2020	a. Learn the meaning and approach of great and little

					<p>traditions</p> <p>b. learn about the peasant societies and contemporary peasant societies</p> <p>c. know the culture of poverty, institution and complex societies</p> <p>d. understand problems of urbanization and social changes</p>
34	M.Sc. Anthropology	ANS 303	Ecological Anthropology	2020	<p>a. Understand the environment and ecosystem in understanding the cultural modifications</p> <p>b. Know about the cultural ecology, cognitive ecology, single unified ecology, and ethno ecology.</p> <p>c. Learn issues and prospects on development projects and displacement</p> <p>d. Understand Biodiversity for sustainable development Knowabout Ecological protest movements (Chipko and Narmada Bachao Andolan (NBA));</p>
35	M.Sc. Anthropology	ANS 304	Applied Anthropology- Indigenous Communities	2020	<p>a. Know the Similarities and Differences between Applied and Action Anthropology, Indigenous communities and applied anthropology. Indigenous rights.</p>

					<ul style="list-style-type: none"> b. Know the process of acculturation and assimilation, socialization c. Know about applications of Anthropology in the management of health, agriculture, education and biodiversity and poverty eradication d. Gain the knowledge on tribal welfare, tribal problems, forest and property rights, shifting cultivation and tribal movements
36	M.Sc. Anthropology	ANS 305	Anthropology of Religion Sacred complexes in India	2020	<ul style="list-style-type: none"> a. Know about meaning and relation with power and political leverages, ethnic identity and other aspects of culture in tradition and modern societies b. Know the different anthropological theories of religion c. Know the issues of right of food among by Hindus, five symbols of sikh identity, Aspects of sarora ritual and Shamansism, and Christianity in India d. To understand Contemporary

					issues of religious violence, secularism and fundamentalism
37	M.Sc. Anthropology	ANS307	Data Management and Computer Applications	2020	<ul style="list-style-type: none"> a. Know about data Collection entry and management. b. Understand the M.S. Office. c. Exposed in using the SPSS in preparing charts and various advanced statistics d. Understand the excel package in using data analysis
38	M.Sc. Anthropology	ANS 308	Anthropology and Career Promotion	2020	<ul style="list-style-type: none"> a. Understand the anthropology in competitive examinations b. Know about participatory research appraisal c. Exposed to the issues in tribes, tribal problems and cast populations d. Learn the books to be consulted, review of questions and scheme of valuation
39	M.Sc. Anthropology	ANS 309	Tribal Studies	2020	<ul style="list-style-type: none"> a. Understand the classification and distribution of tribes b. Know the tribal problems like Land Alienation, Indebtedness,

					<p>Migration, and Cultural Degradation.</p> <p>c. To know the shifting cultivation, tribal education and tribal health</p> <p>d. To know the Fifth and Sixth Schedules Constitutional safeguards</p>
40	M.Sc. Anthropology	ANS 401	Structural Anthropology	2020	<p>a. Know the social structure and function of culture</p> <p>b. Understand about the ideal and real social structure and social organization</p> <p>c. Know the general notion of structuralism</p> <p>d. Learn the symbols and structure</p>
41	M.Sc. Anthropology	ANS -402	Developmental Anthropology	2020	<p>a. Know about the Concept of Development and Sustainable Development</p> <p>b. Understand the steps in project preparation, goals, process of implementation and monitoring.</p> <p>c. Role of government, NGOs and peoples participation in development</p>

					d. Know the watershed management and irrigation, resettlement,(Narmada) poverty Alleviation (Velugu); Primary Education (VECs)
42	M.Sc. Anthropology	ANS-403	Medical Anthropology	2020	<ul style="list-style-type: none"> a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health. b. Understand the etiology, control of infections and non-infections diseases c. Understand the ethno-medicine in the management of health and illness behavior d. Understand the modern medical systems and health care delivery services
43	M.Sc. Anthropology	ANS 404	Culture and Management	2020	<ul style="list-style-type: none"> a. Know the concept of organizational culture. Its links with cultural anthropology Organizational ethnography. Anthropology of work b. Understand the Theories of organizational culture. Different anthropological traditions c. Know the How culture affect

					<p>management Changes in management styles Future outlook.</p> <p>d. To understand the Ethno methodological approaches, Organizational symbolism. Integration, differentiation and fragmentation as three perspective approaches to organizational culture</p>
44	M.Sc. Anthropology	ANS 405	Anthropology of Displaced Populations	2020	<p>a. Know the peoples perception towards development and displacement</p> <p>b. Understand the role of government and non-government agencies in the process of displacement, resettlement and rehabilitation.</p> <p>c. Understand policy issues relating development and displacement in legal implications of displacement and rehabilitation</p> <p>d. Learn the Socio-Cultural effects of displacement, Socio disorganization, process of disintegration and reintegration</p>
45	M.Sc. Anthropology	ANS-408	Visual Anthropology	2020	<p>a. Know about the concept, scope and Historical Development of</p>

					<p>visual anthropology</p> <p>b. Know about the appraisal of ethnographic films in cultural context</p> <p>c. Knowledge about descriptive studying of Visual data produced by Cultures</p> <p>d. To understand the ethnographical films, still photos film shootings and commentary</p>
46	M.Sc. Anthropology	ANS -409	Environmental Anthropology	2020	<p>a. Know the meaning and scope eco-system of homeostases, ecological niche and ecosystem development</p> <p>b. Understand the various theoretical formulations</p> <p>c. Understand Biodiversity for Sustainable Development; Development Projects (Hydro-electric, Irrigation Projects and Industries) and Displacement.</p> <p>d. Exposed to the different ecological issues and environmentalism towards development</p>

29. Biochemistry

S.No.	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	BCH101	Biochemical and Biophysical methods	2020	<ol style="list-style-type: none"> 1. Understand the principle, Instrumentation of different types of Light and techniques of Centrifugation and its applications in various fields. 2. Learn about basic Radioactivity principles, measurement method and 3. Acquire knowledge about the basics and latest developments in Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications. 4. Demonstrate skill to explain about principle, Bioinstrumentation techniques
2	BCH 102	Molecular Physiology and community nutrition	2020	<ol style="list-style-type: none"> 1. Gain the knowledge about circulatory and excretory systems. 2. Know the importance of muscular and nervous system. 3. Health benefits and malnutrition of proteins and fats. 4. Know the importance of nutrition in maintenance of health and disease.
3	BCH 103P	Practical related to Biochemical Preparations and Analysis	2020	<ol style="list-style-type: none"> 1. Learn safety and precautionary measures for working in a laboratory. 2. Develop skill and proficiency in preparation of laboratory reagents, minor equipment for conducting experiments 3. Acquire practical training for qualitative and quantitative analysis and their estimation using multiple methods. 4. Gain the knowledge about isolation studies of biological samples.
4	BCH 104P	Practical related to Analytical methods	2020	<ol style="list-style-type: none"> A. Learn how to standardize various biomolecules. B. Separate biomolecules by paper chromatography and thin layer chromatography. C. Demonstrate separation of protein by electrophoresis. D. Isolation and spectrophotometric characterization of plant pigments.
5	BCH	Human values and Professional Ethics	2020	<ol style="list-style-type: none"> 1. Easily understand the Need and Importance of Professional Ethics-

	105P	onaethics-I		<p>Professions.</p> <ol style="list-style-type: none"> Analyse the basic moral concepts- right , ought, duty, obligation, justice. Know about Purusharthas, Dharma, Artha, Kama, Moksha. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavastu. Gain the knowledge about views on Manu and Yajnavalkya
6	BCH 106	CellandBiomolecules	2020	<ol style="list-style-type: none"> Easily understand the difference between prokaryotic and eukaryotic cell division. Understand the classification, structure and biochemical reactions of proteins. Describe the classification, structure and biochemical reactions of nucleic acids. Understand the concept of structural organization of nucleic acids
7	BCH 201	Energymetabolism	2020	<ol style="list-style-type: none"> Explain the broad outlines of intermediary metabolism and its importance in life. Describe the importance of Electron transport and ATP production mechanism. Gain in knowledge in Carbohydrate metabolism and their associated enzymes. Describe the details of lipid metabolism.
8	BCH 202	MetabolismofNitrogenbase molecules	2020	<ol style="list-style-type: none"> Understand the anabolic and catabolic reactions of proteins and amino acids. Gain knowledge in the importance of aminoacids as biosynthetic precursors. Know the biosynthesis and degradation of purine and pyrimidines and their derivatives. How toxic chemicals metabolised by the body through detoxification and carcinogenicity.
9	BCH 203P	PracticalrelatedtoEnzymology	2020	<ol style="list-style-type: none"> Learnabout estimation of various enzymes in biological sample. Learn to perform assay of clinically importantenzyme: serum activity of LDH. Learn aboutthe factors affecting enzymeactivity and determination of enzyme activity. Demonstrate the Immobilization of enzymes.
10	BCH	PracticalrelatedtoMolecul	2020	<ol style="list-style-type: none"> Isolate nucleic acids from various sources.

	204P	arBiology		<ol style="list-style-type: none"> 2. Estimate the nucleic acids quantitatively. 3. Determine the melting temperature. 4. Determine the purity of DNA by UV method.
11	BCH 205	Human values and Professional ethics-II	2020	<ol style="list-style-type: none"> 1. Easily understand the Components, Structure and responsibilities of family and society. 2. To get an idea on Ethical issues in relation to health care professions, engineering, Social justice in health care, Human cloning. 3. To know about Characteristics of ethical problems in management, employee behavior, ethical abuses and work ethics. 4. Understand the Ethical theory, Ecological crisis, Pest control, Pollution, Energy and population. 5. Gain knowledge about the knowledge of Organ trade, Human trafficking, Human rights violation and social disparity pregnancy.
12	BCH 206	Enzymology	2020	<ol style="list-style-type: none"> 1. Distinguish the fundamentals of enzyme properties, nomenclatures, classification. 2. Describe the concepts of enzyme inhibition and mechanism of enzyme action. 3. Students will acquaint with mechanism of enzyme action and various biochemical reactions taking place in living systems. 4. Describe the concepts of co-operative behavior and allosteric regulation.
13	BCH 301	Microbial Biochemistry and Genetics	2020	<ol style="list-style-type: none"> 1. Understand the basics of microbiology like nomenclature and classification and understand the various biological and non-biological methods to control microorganisms. 2. The student will learn about different modes of nutrition in microorganisms, purification and characterization. 3. Understand the basics of genetics and the gene arrangement in prokaryotes. 4. Gain knowledge in bacterial genetics includes the different types of plasmids, bacteriophages and bacterial defense mechanism (CRISPR) and Design.

				and its effect.
14	BCH 302	MolecularBiology	2020	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learn about the mechanism and regulation of transcription in prokaryotes. 3. Learn about genetic code and their evolution. 4. Gain knowledge in Different stages and components of protein synthesis.
15	BCH 303P	PracticalrelatedtoMicrobiology	2020	<ol style="list-style-type: none"> 1. Handle the microscope. 2. Learn Methods of sterilization and preparation of various culture media. 3. Identification of isolated bacteria, and Growth curve of microorganisms. 4. Learn Staining techniques for bacteria and yeast. 5. Gain knowledge in the Preparation of wine from Grapes. 6. Production and estimation of alcohols, citric acid, lactic acid etc.
16	BCH 304P	PracticalrelatedtoClinical BiochemicalAnalysis	2020	<ol style="list-style-type: none"> 1. Collect and maintain the biological samples for clinical assay. 2. Estimate the blood and serum enzymes for diagnosis of diseases. 3. Qualitatively analyse the abnormal constituents in urine. 4. Work with diagnostic kits
17	BCH305 GenericE lective(T wopapers outofthre e)	a) MolecularEndocrinology b) ClinicalBiochemistry CellandDevelopmentalBiology	2020	<ol style="list-style-type: none"> 1. Know about the mechanism of action of different hormones secreted by pineal glands. 2. Familiar with Iodine, Calcium metabolisms and disorders related to them. 3. Know about the mechanism of action of insulin, glucagon and many other hormones. 4. Acquire knowledge on Hormonal regulation and disorders associated with Gonadal hormones.
18	BCH 305 B	Clinical Biochemistry	2020	<ol style="list-style-type: none"> 1. Maintain clinical biochemistry laboratory, biological specimen collection and investigation of disorders associated with carbohydrates. 2. Learn and understand the Inborn errors of amino acid metabolism, Lipid metabolism.

				<ul style="list-style-type: none"> 3. Gain knowledge in clinical enzymology and Disorders of Gastrointes 4. Investigate the serum enzymes in liver
19	BCH-305c	Cell and Developmental Biology	2020	<ul style="list-style-type: none"> 1. Acquire knowledge on basic concepts of Developmental Biology. 2. Gain the proficient knowledge about zygote formation, blastula form in early development. 3. Understand Organogenesis, limb development and regeneration in development in animals and Plant tissue culture, Protoplast fusion and 4. Acquire knowledge about biomembrane concept and various membra
20	BCH306 Open Elective toothers	<p>a) General Biochemistry</p> <p>b) Environmental Biochemistry</p>	2020	<ul style="list-style-type: none"> 1. Understand the classification, structure and biochemical reactions 2. Describe the classification, structure and biochemical reactions of 3. Understand the concept of structural organization of nucleic acids 1. Describe the Structure of porphyrins, Chemistry and functions of w 2. Students will be able to know how to conserve natural resources f 3. Students will be able to describe differing types of <i>ecosystems</i> and 4. Gain the knowledge about different types of pollution in the environ 5. Know the Relation between human population and environment. 1. Understand the principle, Instrumentation of different types of Light and techniques of Centrifugation and its applications in various field 2. Learn about basic Radioactivity principles, measurement method and 3. Acquire knowledge about the basics and latest developments in Electrophoresis (IEF, 2D PAGE) and Chromatography and their app 4. Demonstrate skill to explain about principle, Bioinstrumentation techniques

		c) Experimental aspects related to analytical methods		
21	BCH401	Genetic Engineering	2020	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification 2. Understand the mechanisms of regulation of gene expression in d 3. Know the techniques for transfer and expression of cloned gene a 4. Apply the knowledge of genetic engineering in biological research 5. principle, Bioinstrumentation and applications of spectroscopy tec
22	BCH402	Technical Writing, Biostatistics and Bioinformatics	2020	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributi 3. Develop understanding about biological data and database search too 4. Acquire hands on training on various computational tools and t <p style="margin-left: 40px;">sequence analysis</p>
23	BCH403P	Practical related to Immunology and Hematology	2020	<ol style="list-style-type: none"> 1. Collect the blood samples and handle the microscope. 2. Analyze the blood samples. 3. Expert in immunodiffusion and immunoelectrophoresis techniques
24	BCH404P	Practical/Projectwork	2020	
25	BCH405 Generic E lective	a) Immunology	2020	<ol style="list-style-type: none"> a. Gain knowledge on different types of antigens, antibodies and h produced. b. Out line, compare and contrast the key mechanism of innate and a c. Gain knowledge on undesirable immunological reactions and management. d. 4. Apply knowledge in disease diagnosis through serological tests. <ol style="list-style-type: none"> 1. Gain knowledge in Fermentation Technology and industrial produc 2. Learn Industrial application of Enzyme Technology.

		b) Applied Biochemistry		<ol style="list-style-type: none"> 3. Gain knowledge in Applications of hybridoma technology. 4. Understand the applications of genetic engineering in biotechnological Organisms. 5. Understand the Structure, function and mechanisms of action of phototropins; <ol style="list-style-type: none"> 1. Gain knowledge in special features of secondary plant metabolism. 2. Know the evolutionary studies Origin of basic biological molecules. 3. Understand the Concepts of natural evolution and population genetics.
26	BCH406 Open Elective toothers(For other department students)	c) Plant Biochemistry a) Research Methodology	2020	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about Biological data and database search techniques. 4. Acquire hands on training on various computational tools and sequence analysis. <ol style="list-style-type: none"> 1. Maintain clinical biochemistry laboratory, biological specimen investigation of disorders associated with carbohydrates. 2. Learn and understand the Inborn errors of amino acid metabolism, Lysine system.

		b) Biochemistry of diseases		3. Gain knowledge in clinical enzymology and Disorders of Gastrointestinal diseases 4. Investigate the serum enzymes in liver diseases
27		C) Nutritional Biochemistry	2020	1. Determine the body composition and body weight by using various methods. 2. To describe the importance of protein and fats. 3. Gain knowledge on vitamins and minerals to maintain health. 4. Acquire knowledge on nutritional importance in different ages in the life cycle.

Immunotechnology

S.No.	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	Core1	Biochemical and Biophysical methods	2020	1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research. 2. Learn about basic Radioactivity principles, measurement method and its biological applications. 3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields. 4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques
2	Core2	Molecular Physiology and	2020	5. Gain the knowledge about circulatory and excretory systems.

		community nutrition		<p>6. Know the importance of muscular and nervous system.</p> <p>7. Health benefits and malnutrition of proteins and fats.</p> <p>8. Know the importance of nutrition in maintenance of health and diseases</p>
3	Core3P	Practical related to Biochemical Preparations and Analysis	2020	<p>1. Learn safety and precautionary measures for working in a laboratory.</p> <p>2. Develop skill and proficiency in preparation of laboratory reagents and Use of handling of glass wares, minor equipment for conducting experiments</p> <p>3. Acquire practical training for qualitative and quantitative analysis of biological materials/molecules and their estimation using multiple methods.</p> <p>4. Gain the knowledge about isolation studies of biological samples.</p>
4	Core4P	Practical related to Analytical methods	2020	<p>1. Learn how to standardize various biomolecules.</p> <p>2. Separate biomolecules by paper chromatography and thin layer chromatography</p> <p>3. Demonstrate separation of protein by electrophoresis.</p> <p>4. Isolation and spectrophotometric characterization of plant pigments</p>
5	Compulsory Foundation	Cell and Biomolecules	2020	<p>6. Easily understand the difference between prokaryotic and eukaryotic cells, and the concept of cell division.</p> <p>7. Understand the classification, structure and biochemical reactions of amino acids and proteins.</p> <p>8. Describe the classification, structure and biochemical reactions of carbohydrates and lipids.</p>

				9. Understand the concept of structural organization of nucleic acids.
6	Elective foundation	Human values and Professional ethics-I	2020	<p>10. Easily understand the Need and Importance of Professional Ethics- Goals- Ethical Values in various Professions.</p> <p>11. Analyse the basic moral concepts- right , ought, duty, obligation, justice, responsibility and freedom.</p> <p>12. Know about Purusharthas, Dharma, Artha, Kama, Moksha.</p> <p>13. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavratasandanuvratas.</p> <p>14. Gain the knowledge about views on Manu and Yajnavalkya.</p>
7	Core1	Energy metabolism	2020	<p>1. Explain the broad outlines of intermediary metabolism and importance of carbohydrate metabolism in life.</p> <p>2. Describe the importance of Electron transport and ATP production mechanism.</p> <p>3. Gain in knowledge in Carbohydrate metabolism and their associated disorders.</p> <p>4. Describe the details of lipid metabolism.</p>
8	Core2	Metabolism of Nitrogen based molecules	2020	<p>1. Understand the anabolic and catabolic reactions of proteins and amino acids.</p> <p>2. Gain knowledge in the importance of amino acids as biosynthetic precursors.</p> <p>3. Know the biosynthesis and degradation of purine and pyrimidines and their associated disorders.</p> <p>4. How toxic chemicals are metabolised by the body</p>

				through detoxification and the mechanism of carcinogenicity.
9	Core3	Practicalrelatedto Enzymology	2020	<p>5. Learnabout estimation of various enzymes in biological sample.</p> <p>6. Learn to perform assay of clinically important enzyme: serum acid and alkaline phosphatase, serum LDH.</p> <p>7. Learn about the factors affecting enzyme activity and determination of Km.</p> <p>8. Demonstrate the Immobilization of enzymes</p>
10	Core4	Practicalrelatedto MolecularBiology	2020	<p>1. Isolate DNA from bacterial, plant and animal cells and RNA from yeast cells.</p> <p>2. Estimate concentrations of DNA and RNA by conventional methods and UV absorption methods.</p> <p>3. Determine the melting temperature(T_m) of DNA.</p> <p>4. Learn procedures for isolation of phageM₁₃ and single and double standard M₁₃DNA.</p>
11	Compulsor y Foundation	Enzymology	2020	<p>1. Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms.</p> <p>2. Describe the concepts of enzyme inhibition and mechanism of enzyme catalysis.</p> <p>3. Students will acquaint with mechanism of enzyme action and various coenzymes involved in the biochemical reactions taking place in living systems.</p> <p>4. Describe the concepts of co-operative behaviour and allosteric regulation</p>
12	Elective foundation	Humanvaluesand Professionaethics-II	2020	<p>6. Easily understand the Components, Structure and responsibilities of family and status of women in</p>

				<p>family and society.</p> <p>7. To get an idea on Ethical issues in relation to health care professionals and patients and genetic engineering, Social justice in health care, Human cloning.</p> <p>8. To know about Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.</p> <p>9. Understand the Ethical theory, Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population.</p> <p>10. Gain the knowledge about Organtrade, Humantrafficking, Humanrightsviolation andsocialdisparities, Feminist ethics, Surrogacy/ pregnancy</p>
13	Core1	MicrobialBiochemistry andGenetics	2020	<p>1. Understand the basics of microbiology like nomenclature and classification of microorganisms and different modes of nutrition in microorganisms.</p> <p>2. Learn and understand the various biological and non-biological methods to control microorganisms and Biology of subviralagents – Viroids, Prions, Satelliteviruses.</p> <p>3. Understand the basics of genetics and the gene arrangement in prokaryotes and eukaryotes.</p> <p>4. Gain knowledge in bacterial genetics like different types plasmids, recombination in bacteria, bacteriophages and bacterial defense mechanism(CRISPR) and various types of mutations and their effects</p>
14	Core2	Immunology	2020	<p>1. Gain knowledge on different types of antigens, antibodies and how different types of antibodies are</p>

				<p>produced.</p> <ol style="list-style-type: none"> 2. Out line, compare and contrast the key mechanism of innate and adaptive immunity 3. Gain knowledge on undesirable immunological reactions and their complications in health management 4. Apply knowledge in disease diagnosis through serological tests
15	Core3	Practicalrelatedto Microbiology	2020	<ol style="list-style-type: none"> 1. Handle the microscope. 2. Learn Methods of sterilization and preparation of various culture media, Purification techniques. 3. Identification of isolated bacteria, and Growth curve of microorganism. 4. Learn staining techniques for bacteria and yeast. 5. Gain knowledge in the Preparation of wine from Grapes. 6. Production and estimation of alcohols, citric acid, lactic acid etc
16	Core4	Practicalrelatedto Immunology	2020	<ol style="list-style-type: none"> 1. Perform RBC, WBC count and differential count. 2. Do all haematological tests that will be done in clinical labs. 3. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc. 4. Do Heme agglutination tests for identification of different antigens
17	Generic Elective(Two papersoutof three)	a)MolecularBiology	2020	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learnabout the mechanism and regulation of transcription in prokaryotes and eukaryotes.

				<p>3. Learn about genetic code and their evolution.</p> <p>4. Gain knowledge in Different stages and components of protein synthesis</p>
		b)MolecularEndocrinology	2020	<p>1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands.</p> <p>2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands.</p> <p>3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones.</p> <p>4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones.</p>
		c)Cell and Developmental Biology	2020	<p>1. Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion, Apoptosis, Senescence, integrins.</p> <p>2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development.</p> <p>3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants.</p> <p>4. Gain knowledge about Miscelle, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis.</p>

18	Open Elective to others (For other department students)	a) Basics of Immunology	2020	<ol style="list-style-type: none"> 1. Gain knowledge on essential features of different types of antigens, antibodies. 2. Outline, compare and contrast the key mechanism of innate and adaptive immunity. 3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation. 4. Apply knowledge in disease diagnosis through serological tests.
		b) Immunotechniques	2020	<ol style="list-style-type: none"> 1. To purify and analyse the antigens and antibodies. 2. To apply different Hybridization techniques and ELISA, RIA. 3. To detect various diseases by application of antiisera. 4. To engineer antibodies and catalytic antibodies and produce drugs to allergies
19	Core1	Microbial Biochemistry and Genetics	2020	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes, vector construction. 2. Understand the mechanisms of regulation of gene expression in different operons. 3. Know the techniques for transfer and expression of cloned gene and 4. Apply the knowledge of genetic engineering in biological research
20	Core2	Immunology	2020	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about Biological data and

				<p>database search tools.</p> <p>4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis</p>
21	Core3	Practicalrelatedto Microbiology	2020	<ol style="list-style-type: none"> 1. Use diagnostic kits to test different types of auto immune diseases. 2. Prepare Rabbit for performance of immunological studies. 3. Perform Single Radial Immunodiffusion. 4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc. 5. Do Heme agglutination tests for identification of different antigens
22	Core4	Practicalrelatedto Immunology	2020	<ol style="list-style-type: none"> 1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 2. Learn structure, function of gene and its transfer methods 3. Develop understanding on cause, spread and control of diseases caused by different microorganisms 4. Get knowledge on collection of data, thesis writing.
23	Generic Elective(Two papersoutof three)	a)MolecularBiology	2020	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learnabout the mechanism and regulation of transcription in prokaryotes and eukaryotes.

				<p>3. Learn about genetic code and their evolution.</p> <p>4. Gain knowledge in Different stages and components of protein synthesis</p>
		b)MolecularBiology	2020	<p>1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands.</p> <p>2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands.</p> <p>3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones.</p> <p>4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones</p>
		c)Cell and DevelopmentalBiology	2020	<p>1. Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion, Apoptosis, Senescence, integrins.</p> <p>2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development.</p> <p>3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants.</p> <p>4. Gain knowledge about Miscellaneous, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis</p>
24	Open Elective	c) Basics of Immunology	2020	<p>1. Gain knowledge on essential features of different types of antigens, antibodies.</p>

	others (For other department students)	Immunotechniques		<p>2. Out line, compare and contrast the key mechanism of innate and adaptive immunity.</p> <p>3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation.</p> <p>4. Apply knowledge in disease diagnosis through serological tests.</p>
25	Open Elective(b)	<i>Immunotechniques and their Applications</i>	2020	<p>1. To purify and analyse the antigens and antibodies.</p> <p>2. To apply different Hybridization techniques and ELISA, RIA.</p> <p>3. To detect various diseases by application of antiisera.</p> <p>4. To engineer antibodies and catalytic antibodies and produce drugs to allergies.</p>
26	Core1	<i>Genetic Engineering</i>	2020	<p>1. Familiar with the tools and techniques for isolation and purification of genes, vector construction.</p> <p>2. Understand the mechanisms of regulation of gene expression in different operons.</p> <p>3. Know the techniques for transfer and expression of cloned gene and</p> <p>4. Apply the knowledge of genetic engineering in biological research</p>
27	Core2	<i>Technical Writing, Biostatistics and Bioinformatics</i>	2020	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Learn to apply hypothesis testing via some of the statistical distributions.</p>

				<ul style="list-style-type: none"> 3. Develop understanding about Biological data and database search tools. 4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis.
28	Core3P	<i>PracticalrelatedtoClinicalImmunology, BiostatisticsandBioinformatics</i>	2020	<ul style="list-style-type: none"> 1. Use diagnostic kits to test different types of auto immune diseases. 2. Prepare Rabbit for performance of immunological studies. 3. Perform Single Radial Immunodiffusion. 4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc. 5. Do Heme agglutination tests for identification of different antigens
29	Core4	<i>ProjectWork</i>	2020	<ul style="list-style-type: none"> 1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 2. Learn structure, function of gene and its transfer methods 3. Develop understanding on cause, spread and control of diseases caused by different microorganisms 4. Get knowledge on collection of data, thesis writing
30	GenericElective (a)	<i>Clinical Immunology</i>	2020	<ul style="list-style-type: none"> 1. Understand different types of immunity and components of the Immune System. 2. Gain knowledge on auto immune diseases, Animal models used to study them and the treatment for them. 3. Familiar with Clinical manifestation of graft rejection, general immuno

				<p>suppressivetherapy and immunetolerancetoallografts.</p> <p>4. Acquire the knowledge on oncogenes, Psychoimmunology and neuroimmunomodulation</p>
31	Generic Elective (b)	<i>Applied And Molecular Immunology</i>	2020	<p>1. Develop skill in production of monoclonal antibodies.</p> <p>2. How better enzyme immobilization enhances its activity and their industrial and clinical applications.</p> <p>3. Familiar with different types of vaccines and how they help in prevention of diseases.</p> <p>4. Acquire the knowledge on IPR and procedures for patent filing</p>
32	General Elective (C)	<i>Immunopharmacology</i>	2020	<p>1. Understand about drug receptors, pharmacodynamics, pharmacokinetics, drug biotransformation.</p> <p>2. Acquire knowledge on Immunomodulation therapy, malignancytherapy.</p> <p>3. Gain knowledge on Prostaglandins, thromboxanes, leukotrienes andinhibitorsofthese molecules formation.</p> <p>4.Familiar with Nitricoxide anditsimmunologicaleffects.</p>
33	Open Elective	<i>Research Methodology</i>	2020	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Acquire hands on training on various computational tools and techniques.</p> <p>3. Learn to apply hypothesis testing via some of the statistical distributions.</p> <p>4. To acquire knowledge on research proposals and motivate students towards research</p>
34	Open Elective	<i>Immunological Diseases and</i>	2020	<p>1. Maintain the Clinical Immunology lab with all</p>

e(b)	<i>Therapeutics</i>		<p>required standards.</p> <p>2. Out line, compare and contrast the key mechanism of innate and adaptive immunity.</p> <p>3. Gain knowledge on different types of immunodeficiencies, their treatment and about autoimmune disorders.</p> <p>4. Familiar with Clinical manifestation in graft acceptance or rejection and how immunosuppressive therapy is useful. And about cancerimmunotherapy.</p>
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30. Botany

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	BOT-101	Algae, Bryophytes, Pteridophytes and Gymnosperms	2020	<ol style="list-style-type: none"> 1. The student able to distinguish different species of lower plant groups. 2. Cultivation methods of Algae for industrial production of Single Cell Proteins, Agar Agar ,carragin and Neutraceuticals.Discuss the importance of morphological structure, classification, reproduction and economic importance of Algae.
2	BOT-102	Taxonomy of Angiosperms	2020	<ol style="list-style-type: none"> 1) Plant identification skills 2) Herbaria preparation and documentation.
3	BOT-103	Microbiology	2020	<ol style="list-style-type: none"> 1. Isolation and identification of Pathogenic and Non-Pathogenic micro-organisms. 2. Methods of cultivation of economically/industrially important microorganisms.

				3. Plant disease identification and control methods.
4	BOT-104	Human Values and Professional Ethics - I	2020	<ol style="list-style-type: none"> 1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
5	BOT-105P	Practical-I Algae, Bryophytes, Pteridophytes and Gymnosperms & Taxonomy of Angiosperms	2020	<ol style="list-style-type: none"> 1) Identification of different Algal forms 2) Morphological description and use of Floral Keys for plant identification.
6	BOT-106P	Practical-II Microbiology & Plant Development and Reproduction	2020	<ol style="list-style-type: none"> 2. Isolation, culture and staining methods for identification of micro-organisms. 3. Diagnosis of Plant diseases based on symptoms and control methods. 3. Histology of vegetative and reproductive structures and isolation
7	BOT-201	Plant Ecology	2020	<ol style="list-style-type: none"> 1) Concepts of Ecology Students, relation between biotic and abiotic factors in an ecosystem. 2) Interaction between biotic communities and ecological energetics 3) Environmental pollution, Global warming and Environmental protection strategies and green energy

				production
8	BOT-202	Plant Biochemistry and Metabolism	2020	<ol style="list-style-type: none"> 1) Biosynthesis of plant primary metabolites and chemistry. 2) Plant physiological processes water relation, plant nutrition and energy metabolism, 3) Metabolic changes in response to biotic and abiotic stress
9	BOT-203	Plant Development and Reproduction	2020	<ol style="list-style-type: none"> 1. Wood formation and types 2. Reproductive structures. Mode of Reproduction
10	BOT-204	Human Values and Professional Ethics - II	2020	<ol style="list-style-type: none"> 1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
11	BOT-205P	Practical-I Plant Biochemistry and Metabolism & Phytobiodiversity and Conservation	2020	<ol style="list-style-type: none"> 1. Plant metabolite analysis and metabolic enzyme activity 2. Methods for Phytodiversity analysis.
12	BOT-206P	Practical-II Plant Ecology & Cell Biology, Genetics and	2020	<ol style="list-style-type: none"> 1) Plant communities 2) Methods for analysis of environmental pollutants 3) Designs of waste water treatment plants.

		Evolution		<ul style="list-style-type: none"> 4) Assessment of effect of Global warming on Plant systems 5) Study of chromosomal morphology and behavior in Mitosis and Meiosis 6) Practical Problem solving on genetic concepts
13	BOT-301	Molecular Biology And Techniques	2020	<ul style="list-style-type: none"> 1. Nucleic acids properties and mechanism of DNA replication and damage repair, and Chromatin organization and Cell Cycle regulation 2. Gene expression, processing of Transcripts and Proteins, and mechanisms of regulation of gene expression in Prokaryotes and Eukaryotes. 3. Principles of Microscopy, Nucleic acid and protein separation and identification techniques and methods
14	BOT-302	Biodiversity and Conservation	2020	<ul style="list-style-type: none"> 1. Knowledge on Phytodiversity, biodiversity centres and types of Biodiversity. 2. Phytodiversity analysis using Remote sensing Causes for the loss of phytodiversity and conservation strategies
15	BOT-303 IE	Biosystematics	2020	<ul style="list-style-type: none"> 1. Biosystematic Categories, 2. Omega Taxonomy 3. Taximetrics and Concept of Species
16	BOT-304IE	Molecular Plant Pathology	2020	<ul style="list-style-type: none"> 1. Symptoms based Diagnosis of Plant Diseases 2. Methods of Plant Disease Management and pest control
17	Abot-306	Computer Applications and Bioinformatics	2020	<ul style="list-style-type: none"> 1. Computer Operating systems and MS Office 2. The biological databases and Databases 3. Bioinformatics, tools and its applications.
18	BOT-307	Plants and Human	2020	<ul style="list-style-type: none"> 1. Food Yielding Plants as a source of food, fiber and

	IE	Welfare		<p>timber.</p> <p>2. Plants used in curing human diseases and other ailments in traditional medical systems and Veterinary diseases</p> <p>3. Spices and condiments, Non timber forest products.</p> <p>4. Preparation and application of Bio fertilizers, Bio pesticides, Bio insecticides, mushroom cultivation and plant based preservatives</p>
19	BOT-308 IE	Organic Farming and Mushroom Cultivation	2020	<p>1. Different types of compost preparation and their Nutritive value.</p> <p>2. Biofertilizers and organic preparations, their marketing and farm management.</p> <p>3. Vermicompost Technology</p> <p>4. Identification of types of edible and poisonous mushrooms.</p> <p>5. Method of cultivation of mushrooms and diseases management</p>
20	BOT-309 IE	Gardening and Nursery Techniques	2020	<p>1. Nurseries development and Management and Garden designing for different plant groups</p> <p>2. <i>In vivo</i> and <i>in vitro</i> plant propagation methods</p> <p>3. Plant nutrition and protection</p> <p>4. Types of gardens and nurseries</p>
21	Practical-I	Molecular Biology And Techniques ; Biodiversity and Conservation	2020	<p>1.. Study of Chromosomal Behavior during Mitosis.</p> <p>2. Isolation of DNA, RNA and proteins, Quantitative estimation</p> <p>3. Assignments on DNA structure, Replication and Gene expression</p> <p>4. Methods for Phytodiversity analysis.</p> <p>5. Plant diversity conservation methods</p>

22	Practical-II	Biosystematics / Molecular Plant Pathology /Computer Applications and Bioinformatics.	2020	<p>Biosystematics</p> <ol style="list-style-type: none"> 1. Isolation of Pathogenic Fungi and Bacteria. 2. Estimation of Rhizosphere, Phyllosphere, Spermosphere microorganisms by Serial dilution methods. 3. Screening of Botanical Pesticides (plant extracts) against Fungal Pathogens 4. Preparation of Plant Pathology Herbarium <p>Molecular Plant Pathology</p> <ol style="list-style-type: none"> 1. Isolation of Pathogenic Fungi and Bacteria. 2. Estimation of Rhizosphere, Phyllosphere, Spermosphere microorganisms by Serial dilution methods. 3. Screening of Botanical Pesticides (plant extracts) against Fungal Pathogens 4. Preparation of Plant Pathology Herbarium <p>Computer Applications and Bioinformatics</p> <ol style="list-style-type: none"> 1. Internet – E-mail and mail attachment Downloading 2. Webpage; Search engines; 3. Visit to DNA and Protein database; NCBI; EMBL, Swiss- Prot ;PDB 4. Use of similarity search tools: NBLAST; PBLAST 5. Use of literature database Virtual library; Agricola; PubMed
23	BOT-401	Molecular Genetics &	2020	<ol style="list-style-type: none"> 1. Genetic basis of inheritance of genes and their

		Genomics and Proteomics		<ul style="list-style-type: none"> mapping in eukaryotes and microbes 2. Molecular marker techniques and construction of genetic and physical maps. 3. Whole genome sequencing strategies, and structural and functional annotation. 4. Principles and methods of Transcriptome and Proteome analysis. 5. Mechanisms of evolution of genomes, New genes and proteins and construction of Phylogenetic trees. 6. Structural organization of plant genomes, Arabidopsis and rice genomes and applications of genome projects.
24	BOT-402	Plant Biotechnology	2020	<ul style="list-style-type: none"> 1. Techniques of Plant Tissue Culture and Applications. 2. Process of r-DNA technology 3. Production of genetically modified crops and Achievements
25	BOT-403 IE	Molecular Plant Physiology	2020	<ul style="list-style-type: none"> 1. 1.Signal transduction pathways and Senescence 2. 2.Molecular mechanism of Photosynthesis 3. Synthesis and application of Nanomaterials. 4. Molecular Physiology of Stress and Flowering
26	BOT-404 IE	Horticulture and Agricultural Biology	2020	<ul style="list-style-type: none"> 1. Propagation methods for horticultural crops 2. Soil science and fertility management for horticultural crops. 3. Seed production technology of horticultural crops.

27	BOT-405 IE	Ethnobotany and Phytomedicine	2020	<ol style="list-style-type: none"> 1. Ethnobotanical knowledge 2. Medicinal plant Cultivation, Multiplication, Collection, Processing and Marketing 3. Sources of Plant Medicines, Formulations, Diagnostic features and their Biological activity.
28	Practical – I	Molecular Genetics & Genomics and Proteomics; Plant Biotechnology	2020	<ol style="list-style-type: none"> 1) Isolation of genomic DNA and RNA and Quantification by Spectrophotometry. 2) Preparation of DNA denaturation curve 3) Restriction digestion of DNA, Agarose Gel Electrophoresis 4) PCR amplification of DNA. and RAPD analysis. 5) Precipitation of proteins ,Estimation of protein. 6) Determination of Isoelectric Point of proteins 7) Separation of proteins by SDS-PAGE and size determination 8) Problems related to genomics, proteomics and molecular evolution 9) Establishment of callus, organ and cell cultures
29	Practical - II	Molecular Plant Physiology; Horticulture and Agricultural Biology; Ethnobotany and Phytomedicine	2020	<p>BOT-403 IE : Molecular Plant Physiology</p> <ol style="list-style-type: none"> 1. Extraction and Estimation of Chlorophyll pigments. 2. Assay of enzyme activity 3. Estimation of Carbohydrate, proteins and separation 4. Seed viability and germination 5. Metabolite accumulation under stress <p>BOT-404 IE: Horticulture and Agriculture Biology</p> <ol style="list-style-type: none"> 1. Isolation, Characterization and Identification of

				<p>Rhizobium</p> <ol style="list-style-type: none"> 2. Outdoor cultivation of Blue green Algae 3. Vermicompost production 4. Multiplication of VAM and Preparation Biofertilizers; 5. Establishment of nursery, different containers, soil transplantation techniques. 6. Plant propagation – layering, cutting, grafting. 7.. Layout and Designing of gardens and Lawns. <p>BOT-405 IE: Ethnobotany and Phytomedicine</p> <ol style="list-style-type: none"> 1. Recording medicinal practices and herbal formulations of tribal medicine by interviews and field study and preparation of report. 2. Development of medicinal plant nurseries in botanical garden. 3. Practical Methods of Cultivation, Propagation, Conservation and Protection of important Medicinal plants to develop familiarity. 4. Micro-propagation of Medicinal plants and Production of Callus from different Explants for Specific Biologically active Ingredients. 5. Practical demonstration of collection, processing and storage of Plant Medicines. 6. Demonstration of drug Formulation and Herbal cosmetics. 7. Organoleptic examination and physical and chemical properties.
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31.Biotechnology

S.No	PROGRAMME	COURSE CODE	COURSE TITLE	Years of Introduction	Course Outcomes
1	M.Sc. Biotechnology	BTH 101	Structure and Functions of Biomolecules	2020	<ol style="list-style-type: none"> 1. Understand the classification of carbohydrates and their biochemical functions. 2. Correlate the reactions of amino acids that are basis for identification tests and biochemical pathways. 3. Know the structure of different classes of lipids and their roles in biological systems. 4. Comprehend the structure and functions of nucleic acids
2		BTH102	Advanced Tools and Techniques	2020	<ol style="list-style-type: none"> 1. Learn about various techniques for isolation and concentration of macromolecules. They will also understand the principles and applications of different Microscopes 2. Understand the techniques of chromatography, centrifugation and electrophoresis

					<ol style="list-style-type: none"> 3. Achieve a basic understanding of characterization of biomolecules by different Spectroscopic techniques 4. They learn safety measures in handling radioisotopes and familiarize with the various radioisotope tracer techniques and their role in biology.
3		BTH103a	Microbiology and diseases	2020	<ol style="list-style-type: none"> 5. Acquire the knowledge on classification and structure of different microorganisms 6. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 7. Learn structure, function of gene and its transfer methods 8. Develop understanding on cause, spread and control of diseases caused by different microorganisms
4		BTH103b	Molecular Plant Physiology	2020	<ol style="list-style-type: none"> 1. Explain the detailed characteristics of chloroplast and mechanism of photosynthesis 2. Engineer photorespiration as well as apply other approaches to increase plant biomass

					<ol style="list-style-type: none"> 3. Gain the proficient knowledge about structure and functionality chloroplast protein and encoding genes as well as hormonal response on plants 4. Correlate phytohormone signalling in plant defense mechanism
5		BTH104a	Cell biology and Genetics	2020	<ol style="list-style-type: none"> 1. Differentiate prokaryotic and eukaryotic cell 2. Understand the organization of genetic material in lower and higher organisms 3. Appreciate the mechanism of mitotic and meiotic process and identify the abnormalities 4. Understand the molecular mechanisms of mutations and its importance in evolution
6		BTH104b	Molecular Genetics	2020	<ol style="list-style-type: none"> 1. Recapitulate Mendelian Principles 2. Understand the mechanisms of sex determination 3. Gain knowledge about types of genes 4. Understand the viral genetics
7		BTH105P	Bio-molecules and Advanced Tools	2020	<ol style="list-style-type: none"> 1. Acquire the skill to

			and Techniques		perform experiments related to Biochemical preparations and advanced tools and techniques
8		BTH106P	Microbiology and Cell Biology	2020	1. Obtain the skill to perform experiments related to Microbiology and Cell Biology
9		BTH107 Auditcourse	Human values and Professional ethics-I	2020	1. Learn the importance of Human values and Professional ethics
10				2020	
11		BTH 201	Enzymes and Intermediary Metabolism	2020	<p>1. Gain knowledge on different enzymes and their significance</p> <p>2. Correlate how the living organisms exchange energy and matter with the surroundings for their survival, and store free energy in the form of energy-rich compounds</p> <p>3. Recognize how the catabolic breakdown of the substances is associated with release of free energy; whereas, free energy is utilized during synthesis of biomolecules i.e., anabolic pathways</p> <p>4. Apply the knowledge of metabolic pathways to biotechnological and biochemical</p>

					research.
12		BTH 202	Molecular Biology	2020	<ol style="list-style-type: none"> 1. Understand the biochemical composition and genome organization in living cells 2. Learn about the mechanism of tissue specific transcription and role of RNA polymerases 3. Appreciate the correlation of genetic code with protein synthesis in prokaryotic and eukaryotic cells. 4. Gain insights of mechanism of gene expression and regulations
13		BTH 203a	Immunology	2020	<ol style="list-style-type: none"> 1. Out line, compare and contrast the key mechanism of innate and adaptive immunity 2. Apply knowledge in disease diagnosis through serological tests 3. Develop skill in production of monoclonal antibodies 4. Gain knowledge on undesirable immunological reactions and their complications in health management
14		BTH 203b	Cancer Biology	2020	<ol style="list-style-type: none"> 1.To understand cancers, the mechanisms involved from theory concept, experimental, research and human health-care

					<p>perspectives</p> <ol style="list-style-type: none"> 2. To acquire the required experimental skills in cancer biology from research and human healthcare perspectives 2. To develop understanding about principles of carcinogenesis 3. Acquire knowledge on signal targets towards therapy of cancer and Gene therapy
15		BTH 204a	Research Methodology, Biostatistics and Bioinformatics	2020	<ol style="list-style-type: none"> 4. Discuss the various steps involved in conducting research 5. Learn to apply hypothesis testing via some of the statistical distributions 6. Develop understanding about Biological data and database search tools 7. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis
16		BTH 204b	Proteomics	2020	<ol style="list-style-type: none"> 1. Handle a proteins and its characterization. 2. Know the principles of proteome quantification. 3. Demonstrate how various types of mass spectrometers (e.g.

					<p>Orbitrap, triple-quad, Q-TOF) can be used for proteome quantification, structure determination of proteins by various methods.</p> <p>4. Use software tools to analyse various quantitative proteomic data types, Principles of statistical analysis of proteomic data, how quantitative proteomics can be applied in biology, clinical research and drug discovery and designing novel proteins.</p>
17		BTH 205P	Enzymology, metabolism and Molecular Biology	2020	Learn the skill to perform experiments related to Enzymology and Molecular Biology
18		BTH 206P	Immunology, Biostatistics and Bioinformatics	2020	Learn the skill to perform experiments related to Immunology and analyze data using various biostatistical methods.
19		BTH 207 Auditcourse	Human values and Professional ethics-II	2020	Learn the importance of Human values and Professional ethics
				2020	
20		BTH 301	Genetic Engineering	2020	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes 2. Acquire knowledge on vectors for construction of genomic

					<p>libraries and cDNA libraries</p> <ol style="list-style-type: none"> 3. Understand the mechanism of cDNA synthesis 4. Know the techniques for transfer and expression of cloned gene and applications of genetic engineering in biological research.
21		BTH 302	Food and Industrial Biotechnology	2020	<ol style="list-style-type: none"> 1. Acquire knowledge on food preservation, processing and control measures for food poisoning 2. Establish indoor and outdoor cultivation units for algal cultivation 3. Learn effective management of solid waste for energy production. 4. Appreciate the industrial role of microorganisms in production of biomolecules
22		BTH 303 a.	Bioprocess Engineering and Technology	2020	<ol style="list-style-type: none"> 1. Handle the axenic cultures of industrially important microbes and appreciate the relevance of microorganisms from industrial context. 2. Gain an overview on design, operations and types of

					<p>fermentation systems</p> <ol style="list-style-type: none"> 3. Calculate yield and production rates in a biological production process, and also interpret data 4. Apply knowledge on separation and purification of end products of fermentation
		BTH 303b.	Legal, Ethical and Implications of Biotechnology	2020	<ol style="list-style-type: none"> 1. Develop awareness on types IPR and patenting process 2. Understand legal and ethical controversies in biotechnological innovations 3. Apply knowledge in providing safety of food, water and environment 4. Gain overview of GM crops and microbes and their impact on environment
		BTH 303c.	Emerging technologies in Biotechnology	2020	<ol style="list-style-type: none"> 1. Acquire the knowledge about recent trends in stem cell technology and medical applications of stem cells 2. Understand the Biosynthesis of nanomaterials and biomedical applications of nanomaterials. 3. Learn role of antibodies in

					<p>biosensing and applications of Nano biosensors in medicine, food industry and environmental monitoring.</p> <p>4. Develop understanding on RNAi Technology and its technological applications</p>
23		BTH 304 P	Genetic Engineering, Food and Industrial Biotechnology	2020	<p>1. Learn the skill to perform the techniques for transfer and expression of cloned gene and applications of genetic engineering in biological research</p>
24		BTH 305	Plant Tissue Culture	2020	<p>1. Learn important milestones in the plant tissue culture and understand the concepts and principles of Plant tissue culture.</p> <p>2. Learn different pathways of plant regeneration under in vitro conditions – organogenesis, somatic embryogenesis, synthetic seeds and applications.</p> <p>3. Understand techniques of establishing cell suspension culture, techniques of virus elimination by meristem and shoot tip culture.</p> <p>4. Acquire skill of propagation of</p>

					elite medicinal and economically important plants and establish micropropagation unit for commercialization.
25		BTH 306a	Bioethics	2020	<ol style="list-style-type: none"> 1. Acquire the knowledge on IPR and procedures for patent filing 2. Understand the Legal and Ethical aspects of gene therapy - cloning - Manipulation of human genome -Technology transfer. 3. Learn role of Government, Industries and society in promoting, accepting and regulating the rDNA research 4. Develop understanding on Environmental and Health aspects of Biotechnology
26		BTH 306b	Bioinformatics	2020	<ol style="list-style-type: none"> 1. Develop understanding about Biological data and database search tools 2. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis 3. Learn about pathway and enzyme databases, Sequence submission tools

					4. Develop understanding on protein folding and its significance
27				2020	
28		BTH 401	Environmental Biotechnology	2020	<ol style="list-style-type: none"> 1. Learn the relation between biotic and abiotic factors in different ecosystem models and predict how changes in free energy availability affect ecosystems. 2. Appreciate the role of microorganisms in biodegradation and pollution detection 3. Develop skill on large scale production and applications of bio pesticides and bio fertilizers fin agriculture 4. Apply knowledge on solid waste management and reclamation of waste water
29		BTH 402	Plant Biotechnology	2020	<ol style="list-style-type: none"> 1. Develop skill in production of transgenic plants resistant to biotic and abiotic stress 2. Apply knowledge for industrial production of plant metabolites 3. Cultivate the micro and macro algae of commercial importance on large scale 4. Identify different plant

					pathogens and apply biological control methods
30		BTH 403a	Animal Biotechnology	2020	<p>Understand the organization of reproductive organs and advances in contraception research</p> <p>2. Learn the techniques of In Vitro Fertilization and artificial insemination</p> <p>3. Develop skill in molecular techniques for production of transgenic animals</p> <p>4. Apply knowledge on molecular farming for production of vaccines and hormones</p>
31		BTH 403b	Applications of Biotechnology	2020	<p>1.Acquire the knowledge on applications of plant, animal and environmental biotechnology</p> <p>2.Develop skill on organic farming and preparation of bio pesticides and bio fertilizers</p> <p>3.Establish and maintain cell lines for vaccine production</p> <p>4.Apply knowledge on waste management and recycling for environmental protection</p>
32		BTH 403c	Pharmaceutical Biotechnology	2020	<p>1.Gain knowledge on preparation and formulations of different</p>

					<p>drugs</p> <ol style="list-style-type: none"> 2. Develop skill on commercial production of pharmaceutical products for human welfare 3. Learn the techniques of drug validation and vaccine production 4. Understand the bioethical principle, values, concepts and social and judicial implications of pharmaceutical biotechnology
33		BTH 404P	Environmental Biotechnology, Plant Biotechnology	2020	1. Learn the techniques related to Environmental and Plant biotechnology
34		BTH 405	MOOCS/Project	2020	1. Select the appropriate research design and develop appropriate research hypothesis for a research project and acquire hands on training on various tools and techniques employed in executing the project.
35		BTH 406a	Applications of Biotechnology	2020	<ol style="list-style-type: none"> 1. Acquire the knowledge on applications of plant, animal and environmental biotechnology 2. Develop skill on organic farming and preparation of bio pesticides and bio fertilizers 3. Able to establish and maintain cell lines for vaccine production 4. Apply knowledge on waste

					management and recycling for environmental protection
36		BTH 406b	Tools in Biotechnology	2020	<ol style="list-style-type: none"> 1. Acquire the knowledge on analysis of DNA replication to map site specific points of replication 2. Learn to apply DNA microarrays to detect replication origins 3. Understand the functions of helicase and polymerase in DNA replication 4. Acquire knowledge on sophisticated programmed of genome replication

32. Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CHE - 101	Inorganic Chemistry I	2020	<p>Understanding the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes.</p> <p>The polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules.</p>

				<p>Learning the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions.</p> <p>Gaining knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.</p>
2	CHE - 102	Organic Chemistry I	2020	<p>Gaining knowledge on stereochemical structures of the molecules, stereoselective and stereocontrolled reactions.</p> <p>Ascertaining the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents.</p> <p>Understanding the concept of isotope effects, potential energy diagrams and transition states in different intermediates.</p> <p>Familiarized with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids.</p>
3	CHE - 103	Physical Chemistry I	2020	<p>Understanding the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics.</p> <p>Learning theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories.</p>

				<p>Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs-Duhem equation, calculation of thermodynamic properties.</p> <p>Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification</p>
4	CHE -104 (A)	General Chemistry I	2020	<p>Gaining Knowledge on mean and median values, standard deviation and coefficient of variation</p> <p>Acquainting knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS.</p> <p>Understanding principle and concept of ecosystem and their functioning</p> <p>Getting an idea on environmental pollution and environmental impact assessment.</p>
5	CHE -104 (B)	General Chemistry I	2020	<p>Familiarizing on green reaction conditions and their impact on environment.</p> <p>Gaining knowledge on use of different biocatalysts as environmentally friendly reagents.</p> <p>Acquainting on the use of modern techniques like ultrasound, microwave etc.</p> <p>Getting an idea on the use of ionic liquids in different reactions.</p>
6	CHE 105 A & B	Core practical I: Inorganic & Physical Chemistry	2020	<p>Knowing the mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations</p> <p>Familiarizing with techniques of titration and calculation of errors.</p>

				<p>Understanding the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different systems.</p> <p>Calibrating the statistical data</p>
7	CHE 106A & B	Core practical I: Organic & General Chemistry	2020	<p>familiarizing the systematic procedures of analysis of organic components.</p> <p>Getting knowledge on the conformational tests for various functional groups.</p> <p>Understanding the mechanisms and familiarize with methodologies to prepare biologically important molecules.</p> <p>Purification of compounds by different process</p>
8	CHE 107	Human Values and Professional Ethics-I	2020	<p>Learning about the needs and importance of professional ethics.</p> <p>Analyzing nature of Values, basic Moral Concepts character and Conduct.</p> <p>Gaining knowledge on individual and society ethical values, ahimsa, satya and brahmacharya.</p> <p>Understanding values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics.</p>
9	CHE - 201	Inorganic Chemistry II	2020	<p>Familiarizing with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes.</p> <p>Learning about Russel-Saunders coupling, splitting</p>

				<p>of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams.</p> <p>Understanding about the laws of Hund's, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Faraday methods.</p> <p>Gaining knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions.</p>
10	CHE-202	Organic Chemistry II	2020	<p>Familiarizing the mechanisms of E_1, E_2 and E_{1CB} reactions, stereoselectivity and synperiplanar eliminations and use of isotopes, chemical trapping and crossover experiments.</p> <p>Learning the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions.</p> <p>Knowing synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions.</p> <p>Understanding the structural elucidation and synthesis of alkaloids using specific reagents.</p>
11	CHE -203	Physical chemistry II	2020	<p>Learning about Pauli Exclusion principle and</p>

				<p>Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems.</p> <p>Knowing Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants.</p> <p>Identifying Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem.</p> <p>Acquiring knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system.</p>
12	CHE-204 A	General Chemistry II	2020	<p>Acquiring knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and principles of amperometric titrations.</p> <p>Learning general principles and classifications of chromatographic separations and applications of TLC, GLC and HPLC.</p> <p>Knowing about biodiversity, ecosystem diversity and conservation of biodiversity.</p> <p>Acquiring knowledge on natural resources related to food, water, mineral, energy and land.</p>
13	CHE 204B	Chemistry in Contemporary Society	2020	<p>Familiarizing knowledge in pharmaceutical chemicals</p> <p>Gaining knowledge with blood fluids, blood,</p>

				<p>enzymes and forensic</p> <p>Knowing about fermentation, detection of purity, beverages</p> <p>Acquiring knowledge on gaseous fuels, soil ingredients and analysis of trace elements</p>
14	CHE 205 A & B	Core practical I: Inorganic & Physical Chemistry	2020	<p>Developing skills to separate and determine the two component mixtures</p> <p>Acquiring knowledge in the preparation of metal complexes</p> <p>Studying the determination of cell constant and verification of Onsagar equation, strength of strong acid by Titration of a strong acid with a strong base and vice versa</p> <p>Getting knowledge on the applications of conductometry, potentiometry, coulometry and pHmetry.</p>
15	CHE 206A & B	Core practical I: Organic & General Chemistry	2020	<p>Familiarizing with binary mixture separation</p> <p>Gaining hands-on-experience in purification of the components, preparation of derivatives.</p> <p>Getting knowledge about the chemical behavior of different components and mechanisms</p> <p>Purification and calibration of data</p>
16	CHE 207	Human Values and professional ethics-II	2020	<p>Understanding the concepts of human values, responsibilities of family values and status of women in family and society.</p> <p>Acquiring knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners.</p>

				<p>Gaining knowledge on social ethics and understand the characteristics of ethical problems in management.</p> <p>Familiarizing environmental ethics, ethical theory and ecological crisis.</p>
17	CHE-AC-301	Inorganic Spectroscopy and Thermal Methods of Analysis	2020	<p>Understanding about TG and DTA and applications of different scanning calorimetry.</p> <p>Gaining knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy.</p> <p>Learning zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR.</p> <p>Knowing about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy.</p>
18	CHE-AC 302	Organic Spectroscopy and Applications	2020	<p>Getting experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds.</p> <p>Familiarizing with the absorption bands of the molecules with specific functional groups</p> <p>Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided</p> <p>Acquiring knowledge about specific fragmentation rules of different molecules which are unique.</p>

19	CHE-AC-303A	Organic Chemistry III	2020	<p>Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules.</p> <p>Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>Understanding diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions</p> <p>Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.</p>
20	CHE-AC-303B	Physical Chemistry III	2020	<p>Understanding the determination of Character Co-ordinate of C_2V point group based on 3N Coordinates and to learn the Mutual exclusion Principle.</p> <p>Learning the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals.</p> <p>Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of</p>

				polymer solutions
21	CHE AC 304	Core practical I: Analytical Chemistry- Practical	2020	Familiarizing the basic principles of instrumental methods of analysis. Gaining knowledge on chemistry of alloys. Understanding the complexity, theory and working principle of colourimetry Familiarizing with laws of colorimetric titrations.
22	CHE AC 305A	Chemotherapy and Drug Analysis	2020	Knowing about the classification and synthesis of drugs. Familiarizing with the qualitative and quantitative analysis of drugs.
23	CHE AC 305B	Instrumental Methods of Analysis	2020	Understanding the complexity, theory and working principle of colourimetry. Gaining knowledge on analysis of organic components
24	CHE AC 306	Spectral Techniques	2020	Knowing the basic principles of spectroscopy. Familiarizing with the analysis of various functional groups by using different spectroscopic techniques. Understanding the applications of AAS. Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.
25	CHE AC 306	Chromatographic Techniques	2020	Understanding the stationary and mobile phases in chromatographic techniques. Familiarizing applications of different chromatographic methods. Understanding the principle of chromatographic

				<p>techniques.</p> <p>Gaining knowledge on the normal phase and reverse phase.</p>
26	CHE-EC-301	Inorganic Spectroscopy and Thermal Methods of Analysis	2020	<p>Knowing about TG and DTA and applications of different scanning calorimetry.</p> <p>Gaining knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy.</p> <p>Learning zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR.</p> <p>Knowing about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy.</p>
27	CHE-EC 302	Organic Spectroscopy and Applications	2020	<p>Getting experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds.</p> <p>Familiarizing with the absorption bands of the molecules with specific functional groups</p> <p>Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided</p> <p>Acquiring knowledge about specific fragmentation rules of different molecules which are unique.</p>
28	CHE-EC-303A	Organic Chemistry III	2020	<p>Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-</p>

				<p>dithianes and Merrifield resin in the synthesis of a variety of complex molecules.</p> <p>Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>Understanding diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions</p> <p>Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.</p>
29	CHE-EC-303B	Physical Chemistry III	2020	<p>Knowing the determination of Character Coordinate of C_{2V} point group based on 3N Coordinates and to learn the Mutual exclusion Principle.</p> <p>Learning the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals.</p> <p>Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
30	CHE EC 304	Core practical I: Environmental Chemistry -	2020	<p>Understanding the basic idea on techniques of water analysis and acidity alkalinity</p>

		Practical		<p>Getting experience with the calculations of BOD and COD</p> <p>Understanding the basics of soil analysis viz. pH, Conductivity</p> <p>Acquiring an experience on the determination of heavy metals in soil</p>
31	CHE EC 305A	Chemotherapy and Drug Analysis	2020	<p>Knowing about the classification and synthesis of drugs.</p> <p>Familiarizing with the qualitative and quantitative analysis of drugs.</p>
32	CHE EC 305B	Instrumental Methods of Analysis	2020	<p>Knowing about the potentiometric analysis of mixtures of acids and halides</p> <p>Familiarizing with the Flame photometric analysis of Na, K, and Li</p>
33	CHE EC 306	Spectral Techniques	2020	<p>Knowing the basic principles of spectroscopy.</p> <p>Familiarizing with the analysis of various functional groups by using different spectroscopic techniques.</p> <p>Understanding the applications of AAS.</p> <p>Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.</p>
34	CHE EC 306	Chromatographic Techniques	2020	<p>Knowing the stationary and mobile phases in chromatographic techniques.</p> <p>Familiarizing applications of different chromatographic methods.</p> <p>Understanding the principle of chromatographic techniques.</p>

				Gaining knowledge on the normal phase and reverse phase.
35	CHE-IC-301	Inorganic Spectroscopy and Thermal Methods of Analysis	2020	<p>Knowing about TG and DTA and applications of different scanning calorimetry.</p> <p>Gaining knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy.</p> <p>Learning zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR.</p> <p>Knowing about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy.</p>
36	CHE-IC-302	Organic Spectroscopy and Applications	2020	<p>Getting experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds.</p> <p>Familiarizing with the absorption bands of the molecules with specific functional groups</p> <p>Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided</p> <p>Acquiring knowledge about specific fragmentation rules of different molecules which are unique.</p>
37	CHE-IC-303A	Organic Chemistry III	2020	Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of

				<p>a variety of complex molecules.</p> <p>Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>Understanding diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions</p> <p>Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.</p>
38	CHE-IC-303B	Physical Chemistry III	2020	<p>Familiarizing the determination of Character Co-ordinate of C_2V point group based on 3N Coordinates and to learn the Mutual exclusion Principle.</p> <p>Learning the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals.</p> <p>Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
39	CHE IC 304	Core practical I: Inorganic Chemistry - Practical	2020	<p>Knowing the synthesis of inorganic complexes</p> <p>Tris thiourea Zinc (II) Sulphate, Tris thiourea Copper(I) Sulphate, Hexamine nickel (II)</p>

				<p>Chloride, Chloropentamine cobalt (III) Chloride</p> <p>Gaining knowledge on characterization techniques</p> <p>Getting experience on the preparation of Mercury tetrakis thiocyanato cobaltate (II) Sodium trioxalato ferrate (III)</p> <p>Familiarizing with the characterization of complexes.</p>
40	CHE IC 305A	Chemotherapy and Drug Analysis	2020	<p>Learning about the classification and synthesis of drugs.</p> <p>Familiarizing with the qualitative and quantitative analysis of drugs.</p>
41	CHE IC 305B	Instrumental Methods of Analysis	2020	<p>Understanding the complexity, theory and working principle of colourimetry.</p> <p>Gaining knowledge on analysis of organic components.</p>
42	CHE IC 306	Spectral Techniques	2020	<p>Knowing the basic principles of spectroscopy.</p> <p>Familiarizing with the analysis of various functional groups by using different spectroscopic techniques.</p> <p>Understanding the applications of AAS.</p> <p>Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.</p>
43	CHE IC 306	Chromatographic Techniques	2020	<p>Knowing the stationary and mobile phases in chromatographic techniques.</p> <p>Familiarizing applications of different chromatographic methods.</p>

				<p>Understanding the principle of chromatographic techniques.</p> <p>Gaining knowledge on the normal phase and reverse phase.</p>
44	CHE-IC-303A	Organic Chemistry III	2020	<p>Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules.</p> <p>Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>Understanding diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions</p> <p>Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.</p>
45	CHE OC 306	Spectral Techniques	2020	<p>Getting experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds.</p> <p>Familiarizing with the absorption bands of the molecules with specific functional groups</p> <p>Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the</p> <p>Acquiring knowledge about specific fragmentation rules of different molecules which</p>

				are unique.
46	CHE-OC-303A	Inorganic Spectroscopy and Thermal Methods of Analysis	2020	<p>Knowing the basic principles of instrumental methods of analysis.</p> <p>Gaining knowledge on chemistry of alloys.</p> <p>Understanding the complexity, theory and working principle of colourimetry</p> <p>Familiarizing with laws of colorimetric titrations.</p>
47	CHE-OC-303B	Physical Chemistry III	2020	<p>Knowing the determination of Character Coordinate of C_{2V} point group based on 3N Coordinates and to learn the Mutual exclusion Principle.</p> <p>Learning the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals.</p> <p>Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
48	CHE OC 304	Core practical I: Organic Estimations - Practical	2020	<p>Gaining knowledge about the estimation/percent purity of different organic molecules.</p> <p>Getting hands-on-experience with the synthesis and determination of concentrations and purity.</p> <p>Acquiring knowledge in handling of toxic chemicals in estimation process.</p> <p>Gaining experience in the calculating the percentage purity.</p>

49	CHE OC 305A	Chemotherapy and Drug Analysis	2020	Knowing about the classification and synthesis of drugs. Familiarizing with the qualitative and quantitative analysis of drugs.
50	CHE OC 305B	Instrumental Methods of Analysis	2020	Acquiring knowledge in handling of toxic chemicals in multistep preparation of biologically important molecules in good percentage of yield. Gaining experience in the proposal of synthetic routes to functionalized derivatives.
51	CHE OC 306	Spectral Techniques	2020	Studying the basic principles of spectroscopy. Familiarizing with the analysis of various functional groups by using different spectroscopic techniques. Understanding the applications of AAS. Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.
52	CHE OC 306	Chromatographic Techniques	2020	Knowing the stationary and mobile phases in chromatographic techniques. Familiarizing applications of different chromatographic methods. Understanding the principle of chromatographic techniques. Gaining knowledge on the normal phase and reverse phase.
53	CHE-PC- 301	Physical Chemistry III	2020	Knowing the determination of Character Co- ordinate of C_2V point group based on $3N$

				<p>Coordinates and to learn the Mutual exclusion Principle.</p> <p>Learning the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals.</p> <p>Studying the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>Studying the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
54	CHE-PC 302	Organic Spectroscopy and Applications	2020	<p>Getting experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds.</p> <p>Familiarizing with the absorption bands of the molecules with specific functional groups</p> <p>Experience to interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided</p> <p>Acquiring knowledge about specific fragmentation rules of different molecules which are unique.</p>
55	CHE-PC- 303A	Organic Chemistry III	2020	<p>Familiarizing with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of</p>

				<p>a variety of complex molecules.</p> <p>Gaining knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>Understanding diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions</p> <p>Acquiring knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.</p>
56	CHE-PC-304	Inorganic Spectroscopy and Thermal Methods of Analysis	2020	<p>Knowing1 about TG and DTA and applications of different scanning calorimetry.</p> <p>Gaining knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy.</p> <p>Learning zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR.</p> <p>Knowing about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron.</p>
57	CHE PC 304	Core practical I: Inorganic spectroscopy and thermal methods of analysis	2020	<p>Studying chemical kinetics of homogeneous solutions</p> <p>Gaining knowledge on the determination of different cations by flame photometry</p> <p>Understanding the principle and working aspects of conductometric titrations</p> <p>Acquirinng knowledge on the implementation of</p>

				colorometric estimations.
58	CHE PC 305A	Chemotherapy and Drug Analysis	2020	Knowing about the classification and synthesis of drugs. Familiarizing with the qualitative and quantitative analysis of drugs.
59	CHE PC 305B	Instrumental Methods of Analysis	2020	Understanding the principle and working aspects of conductometric titrations Acquiring knowledge on the implementation of colorometric estimations.
60	CHE PC 306	Spectral Techniques	2020	Knowing the basic principles of spectroscopy. Familiarizing with the analysis of various functional groups by using different spectroscopic techniques. Understanding the applications of AAS. Gaining knowledge about Mass spectral fragmentation of organic compounds and common functional groups.
61	CHE PC 306	Chromatographic Techniques	2020	Knowing the stationary and mobile phases in chromatographic techniques. Familiarizing applications of different chromatographic methods. Understanding the principle of chromatographic techniques. Gaining knowledge on the normal phase and reverse phase.
62	CHE-AC- 401	Quality Control and General Principles	2020	Able to diagnose problems in the quality improvement process and Explain each total

				<p>quality implementation phase</p> <p>Knowing about theoretical basis for the use of organic reagents in inorganic analysis.</p> <p>Understanding different types of kinetic methods and their evaluation and to determine the kinetics of enzyme</p> <p>Understanding the oxidation reactions with Ce (IV) sulphate solutions and applications of complexometric titrations</p>
63	CHE-AC 402	Instrumental Methods of Analysis	2020	<p>Understanding the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF).</p> <p>Understanding the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC).</p> <p>Getting knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis.</p> <p>Improving the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I⁻ and S²⁻) by using I₂ liberations and Ce⁴⁺ liberation in solutions</p>

64	CHE-AC-403A	Applied and Environmental Aspects	2020	<p>Getting an idea about preparation of sampling, decomposition, separation and preconcentration of metal ions etc.</p> <p>Gaining experience on agrochemicals and fertilizers and their analysis.</p> <p>Having an idea on the analysis of fuels, alloys and explosives</p> <p>Experiencing with environmental pollution monitoring techniques.</p>
65	CHE-AC-403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2020	<p>Gaining knowledge on metallo proteins in electron transfer processes.</p> <p>Knowing the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>Achieving and developing highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.</p>
66	CHE AC 404	Core practical I: Analytical Chemistry- Practical	2020	<p>Understanding the common laboratory techniques including separation techniques</p> <p>Polarography, atomic absorption spectroscopy in both emission and absorption mode.</p> <p>Gaining knowledge on implementation of gas chromatography and HPLC for separation of mixtures.</p> <p>Familiarizing with interpretation of data to structures by NMR.</p>
67	CHE AC	Project Work	2020	Performing experiments, collection and evaluation

	405A			<p>of data.</p> <p>Interpretation of results while adhering to scientific principles of responsible and ethical behaviour.</p> <p>Analysing and compiling the data and results in a chronological order in the form of dissertation.</p> <p>Preparation of dissertation.</p>
68	CHE AC 406A	Drug Chemistry	2020	<p>Knowing about natural products.</p> <p>Knowing Interpretation of cardiovascular drugs.</p> <p>Knowing the Analyzing about prostaglandins.</p> <p>Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.</p>
69	CHE AC 406	Electro analytical Techniques	2020	<p>Knowing how to interpret potentiometry and conductometry</p> <p>Knowing the Interpretation of results while adhering to DC Polarography.</p> <p>Knowing the Analysing and compiling the data and results in polarography .</p> <p>Familiarizing Types of ion sensitive electrodes.</p>
70	CHE-IC- 401	Co-ordination Compounds, Organometallic Chemistry & Chemistry of Non- transition Elements	2020	<p>Gaining an extensive knowledge about dinitrogen complexes of Ru(II), Os(II),Co(I), Mo(0)and dioxygen complexes of Ir(I) and Rh(I) and on cycloheptatriene and tropylium complexes of oxidative, reductive elimination reactions</p> <p>Understanding mechanism, stereochemical aspects and regeneration of catalyst in olefin hydrogenation (Wilkinson's catalyst), olefin</p>

				<p>oxygenation (Wacker process or Smidt reaction), Olefin hydroformylation and Fischer –Tropsch process.</p> <p>Studying the examples of metal complexes having metal-metal single or multiple bonds and analyse the spectroscopic evidences for the presence of metal-metal bond.</p> <p>Understanding the synthesis and structures of boranes, carboranes, borazines, silicates carbides, peroxy compounds and inter halogens, pseudo halides.</p>
71	CHE-IC 402	Instrumental Methods of Analysis	2020	<p>Understanding the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF).</p> <p>Understanding the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC).</p> <p>Getting knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis.</p> <p>Improving the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I- and S²⁻) by using I₂ liberations and Ce⁴⁺ liberation in solutions.</p>

72	CHE-IC-403A	Instrumental Methods of Analysis	2020	<p>Understanding the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF).</p> <p>Understanding the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC).</p> <p>Getting knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis.</p> <p>Improving the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I⁻ and S²⁻) by using I² liberations and Ce⁴⁺ liberation in solutions.</p>
73	CHE-IC-403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2020	<p>Gaining knowledge on metallo proteins in electron transfer processes.</p> <p>Knowing the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>Achieving and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.</p>
74	CHE IC	Core practical I:	2020	Understanding the common laboratory

	403	Inorganic Chemistry - Practical		<p>techniques including separation techniques.</p> <p>Polarography, atomic absorption spectroscopy in both emission and absorption mode.</p> <p>Gaining knowledge on implementation of gas chromatography and HPLC for separation of mixtures.</p> <p>Familiarizing with interpretation of data to structures by NMR.</p>
75	CHE IC 404	Project Work	2020	<p>Having ability to perform experiments, collection and evaluation of data</p> <p>Interpretation of results while adhering to scientific principles of responsible and ethical behaviour.</p> <p>Analysing and compiling the data and results in a chronological order in the form of dissertation.</p> <p>Preparation of dissertation.</p>
76	CHE IC 406A	Drug Chemistry	2020	<p>Knowing about natural products.</p> <p>Knowing Interpretation of cardiovascular drugs.</p> <p>Knowing the Analyzing about prostaglandins.</p> <p>Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.</p>
77	CHE IC 406 B	Electro analytical Techniques	2020	<p>Gaining ability to interpret potentiometry and conductometry</p> <p>Interpretation of results while adhering to DC Polarography.</p> <p>Analysing and compiling the data and results in polarography.</p> <p>Familiarizing Types of ion sensitive electrodes.</p>

78	CHE-OC-401	Organic synthesis I	2020	<p>Familiarizing with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents</p> <p>Learning about photolytic reactions of carbonyl compounds, conjugated carbonyl derivatives, olefins, conjugated dienes.</p> <p>Gaining knowledge in the determination of allowed or forbidden of chemical reactions <i>viz.</i>, cycloaddition and</p> <p>Learning the methods of preparation, properties, and industrial applications of various addition and condensation</p> <p>Familiarizing with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents</p>
79	CHE-OC-402	Organic Synthesis II	2020	<p>Familiarizing with functionalization and interconversion of functional groups and the concept of organic synthesis by retrosynthetic approach.</p> <p>Gaining knowledge in the formulation of synthetic routes for naturally occurring drugs.</p> <p>Understanding quinoline, acridine and guanidine group of alkaloids as antimalarials and to familiarize with the role of functioning of broad spectrum antibiotics.</p> <p>Acquiring knowledge about the classification, properties, structure & conformation and biological functions of peptides/proteins.</p>
80	CHE-OC-403A	Heterocycles and Natural Products	2020	<p>Familiarizing with the synthetic routes of five membered heterocycles with two heteroatoms and to justify the site of</p>

				<p>Acquiring knowledge on the synthetic methodologies of benzofused and six membered heterocycles and the effect of</p> <p>Familiarizing with the structural elucidation and synthesis of naturally occurring steroids and hormones</p> <p>Knowing about isolation, structural determination and synthesis of flavonoids and isoflavonoids.</p>
81	CHE-OC-403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2020	<p>Gaining knowledge on metallo proteins in electron transfer processes.</p> <p>Knowing the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>Achieving and developing highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.</p>
82	CHE OC 404	Core practical I: Spectral Identification of Organic Compounds	2020	<p>Calculating λ max values.</p> <p>Ascertaining functional groups.</p> <p>Interpreting the spectral data to the structure and stereochemistry of the molecules.</p> <p>Analysing the fragmentation pattern of the molecules.</p>
83	CHE OC 405	Practical II: Project Work	2020	<p>Identifying the problem, to collect the literature and understanding parameters to design the problem.</p> <p>Performing experiments to synthesize the molecules with desired stereochemistry adopting</p>

				<p>modern techniques.</p> <p>Collection and interpretation of the data to the structures.</p> <p>Presentation of the data in the form of dissertation.</p>
84	CHE OC 406A	Drug Chemistry	2020	<p>Knowing about natural products.</p> <p>Knowing Interpretation of cardiovascular drugs.</p> <p>Knowing the analyzing about prostaglandins.</p> <p>Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.</p>
85	CHE OC 406	Electroanalytical Techniques	2020	<p>Getting ability to interpret potentiometry and conductometry</p> <p>Interpretation of results while adhering to DC Polarography.</p> <p>Analysing and compiling the data and results in polarography.</p> <p>Familiarizing Types of ion sensitive electrodes.</p>
86	CHE-PC-401	Electrochemistry	2020	<p>Knowing the techniques of deposition of metals, throwing power simultaneous discharge of cations and methods of corrosion protection</p> <p>Learning about electrochemical Batteries, fuel cells and nickel-cadmium batteries.</p> <p>Understanding electrical double layer systems, sedimentation potential, null points of metals and zeta potential.</p> <p>Calculating electrochemical parameters; familiarize mixed ligand systems and reversible systems.</p>

87	CHE-PC 402	Thermodynamics, Polymers and Solid-state Chemistry	2020	<p>Deriving Gibbs Duhem equation and to calculate fugacity and chemical potential.</p> <p>Calculating excess free energy and entropy, to draw Hildebrand curves and to correlate excess functions and activity coefficients</p> <p>Learning morphology, T_m and T_g points and to calculate transition temperatures and to identify cross linking in polymers.</p> <p>Identifying magnetic properties of solids, magnetic materials, superconductors and BCS theory</p>
88	CHE-PC- 403A	Chemical Kinetics	2020	<p>Drawing skrabal pH diagram and to separate unimolecular and bimolecular reactions</p> <p>Studying laws of photochemistry, to derive stern-volmer equation</p> <p>Identifying chromo potentiometry points and to investigate kinetic currents and isotopic effects</p> <p>Learning photochemical thresholds, chemiluminescence</p>
89	CHE-PC- 403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2020	<p>Gaining knowledge on metallo proteins in electron transfer processes.</p> <p>Knowing the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>Achieving and developing highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.</p>

90	CHE PC 404	Core practical I: Inorganic Chemistry - Practical	2020	Getting ability to perform titration of mixture of halides and to draw potentiometry curves Learning amperometric titrations and mixtures by polarography Correlation of data obtained from IR, AAS, HPLC and GC Determination of alkalinity and purity by pH metry
91	CHE PC 404	Project Work	2020	Identifying research problems and to collect research literature Proposing hypothesis of a research problem Performing research experiments Analysing the data and conclude the research outcomes
92	CHE PC 406A	Drug Chemistry	2020	Knowing about natural products. Knowing Interpretation of cardiovascular drugs. Knowing the Analyzing about prostaglandins. Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.
93	CHE PC 406	Electroanalytical Techniques	2020	Getting ability to interpret potentiometry and conductometry Interpretation of results while adhering to DC Polarography. Analysing and compiling the data and results in polarography. Familiarizing Types of ion sensitive electrodes.
94	CHE-EC- 401	Energy, Environment and Soil	2020	Knowing about nuclear fission and fusion, uses of solar energy in space heating and water heating,

				<p>hydropower and water heating, hydropower and production of ethanol from indirect solar energy.</p> <p>Learning physical and chemical properties of water and water complexation in natural and waste water and to understand about global warming, ozone depletion, green house effect and acid rains.</p> <p>Acquiring knowledge on composition of inorganic and organic contaminants in soil, soil corrosion and industrial applications of green chemistry.</p> <p>Getting knowledge on various methods of solid waste collection and its disposal.</p>
95	CHE-EC-402	Water Pollution Monitoring and Environment Laws	2020	<p>Acquiring knowledge on disease causing agents in water.</p> <p>Learning about the removal of suspended and dissolved solids present in waste water.</p> <p>Understanding different uses of micro-organisms in environmental protection.</p> <p>Knowing different world life acts such as forest conversion act, water control pollution act and air prevention and control act.</p>
96	CHE-EC-403A	Air Pollution, Control Methods-Noise and Thermal Pollution	2020	<p>Acquiring knowledge on air pollutants, air pollution sampling measurements and analysis caused due to sulphur dioxide, carbon monoxide, nitrogen dioxide, oxidants, ozone, hydro carbons and particulate matter.</p> <p>Learning about different control methods and adsorption of solids and liquids, gas analysis eluents viz., nitrogen oxides, carbon monoxide</p>

				<p>and hydrocarbons.</p> <p>Understanding pollution caused by vehicle emission, different industries, cement plants, steel mills and petroleum refineries.</p> <p>Knowing about noise and thermal power project pollutions and their effect on human health.</p>
97	CHE-EC-403B	Bioinorganic, Bioorganic, Biophysical Chemistry	2020	<p>Gaining knowledge on metallo proteins in electron transfer processes.</p> <p>Knowing the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>Achieving and developing highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>Understanding thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters.</p>
98	CHE EC 404	Practical I	2020	<p>Knowing the basic principles of conductometry and analysis of acids and halides.</p> <p>Colorometric estimation of iron and manganese.</p> <p>Having an idea about working principles of IR, AAS, Spectrofluorimetry, Gas chromatography and HPLC.</p> <p>Familiarizing with interpretation of data</p>
99	CHE EC 405	Practical II:Project Work	2020	<p>Identifying research problem, propose the hypothesis and to collect literature.</p> <p>Performing research designs & experiments</p> <p>Tabulating research results</p> <p>Concluding research outcomes in the form of dissertation.</p>

100	CHE EC 406A	Drug Chemistry	2020	Knowing about natural products. Knowing Interpretation of cardiovascular drugs. Knowing the Analyzing about prostaglandins. Knowing the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.
101	CHE EC 406	Electroanalytical Techniques	2020	Gaining ability to interpret potentiometry and conductometry Interpretation of results while adhering to DC Polarography. Analysing and compiling the data and results in polarography. Familiarizing Types of ion sensitive electrodes.

33. Environmental Sciences

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	ENV-101	Ecology and Environment	2020	<ul style="list-style-type: none"> • Provide solutions to environmental problems using appropriate tools and techniques. • Develop both a quantitative and qualitative understanding of interactions between organisms and their consequences. • Gain the knowledge of functions of organisms and ecosystem.

2	ENV -102	Environmental Chemistry	2020	<ul style="list-style-type: none"> • Demonstrate knowledge of chemical and biochemical principles of fundamental environmental processes in air, water and soil. • Apply basic chemical concepts to analyze chemical processes involved in different environmental problems. • By knowing pollution levels in the environment best possible fresh environment can be created in different methods like afforestation, natural parks and sanctuaries etc., for human concern.
3	ENV-103P	Practical – I	2020	<ul style="list-style-type: none"> • Imparting practical knowledge about estimation of pH, Total Dissolved Solids, Hardness and Dissolved Oxygen, Chlorides and Sulphates in water samples.
4	ENV-104P	Practical-II	2020	<ul style="list-style-type: none"> • Understanding of various alkalinities present in the water sample by volumetric titration linked with theory. • By knowing water pollution potable water can be drawn out and wastewater can be treated. • By knowing various fertility of the soil can be known which is advantage to farmers for agriculture.
5	ENV-105	Environmental Toxicology and	2020	<ul style="list-style-type: none"> • Tounderstand the role of toxicants in

		Public Health		<p>environment, methods used to quantify toxicity, regulations that govern toxic substances and assessment of risks posed by exposure to toxicants.</p> <ul style="list-style-type: none"> • Inform, educate, and empower people about the potential hazards of toxic substances <p>to environmental and human health.</p> <ul style="list-style-type: none"> • By knowing the adverse health problems on human beings, safety, preventing measures can be implemented endemic and pandemic diseased can be controlled.
6.	ENV-106	Human Values and Professional Ethics-I	2020	<ul style="list-style-type: none"> • Describe the human values, understand the commitment and responsibility. • They gain the ability to bring harmony to the society. • By studying human values reformation of man and reformation of policy shall be done and harmony of environment and society also can be achieved.
7.	EN-201	Energy and Environment	2020	<ul style="list-style-type: none"> • Explain the key challenges and technologies in energy use, utilization of energy resources, energy conversion and environmental consequences. • They explain basic competence regarding environmental impacts arising from different energy carriers and technical solutions.

				<ul style="list-style-type: none"> • Enrichment of ecosystem will be achieved.
8.	ENV-202	Environmental Pollution	2020	<ul style="list-style-type: none"> • Analyze sources of pollution, exposure pathways, fate and evaluate consequences of human exposure to pollution and its impacts to environmental quality. • Distinguish the effect of pollutants on human health, economy and wild environments. • Pollution free environment for human life will be achieved.
9.	ENV-203P	Practical-I	2020	<ul style="list-style-type: none"> • Describe the amount of pesticide/insecticide in water/vegetable samples. • To find concentration levels of toxicant by use of instrumental techniques • To estimate physicochemical assessments in different water samples
10.	ENV-204P	Practical-II	2020	<ul style="list-style-type: none"> • Identify the concentration of biochemical by using instrumental methods. • To find an amount of LC50 of various metals in organism. • To estimate the growth rate of fauna at various habitat condensations.
11	ENV-205	Instrumental Techniques and Applications	2020	<ul style="list-style-type: none"> • Integrate a fundamental understanding of the underlining physics principles as they relate to specific instrumentation

				<p>used for atomic, molecular, and mass spectrometry, magnetic resonance spectrometry and chromatography.</p> <ul style="list-style-type: none"> • Environmental potentiality will be achieved. This is indirect benefits to the society. • To understand the analysis and level of concentration of different metals through instrumental techniques.
12	ENV-206	Human Values and Professional Ethics-II	2020	<ul style="list-style-type: none"> • Understand the core values that shape the ethical behaviour. • An ability to apply their broad education towards the understanding of the impact of engineering solutions in a global and societal context. • Making the students to full man, understanding the ethical values.
13	ENV -301	Waste Treatment and Management	2020	<ul style="list-style-type: none"> • Describe the components of solid waste management and the laws governing it. • Discuss the solid waste collection systems, route optimization techniques and processing of solid wastes. • Biodegradation of waste through natural and artificial methods will be achieved.
14	ENV -302	Environmental Assessment, Audit and Economics	2020	<ul style="list-style-type: none"> • Explain the concepts about the Environmental Impact Assessment (EIA) and describe the environment

				<p>laws, aims and the necessity of EIA.</p> <ul style="list-style-type: none"> • Critically examine assumptions inherent in impact assessment, examine a range of environmental impact assessments and identify and explore impact assessment fields and approaches. • Understand the sustainable development and controlling environmental pollution.
15	ENV -303	Practical-I	2020	<ul style="list-style-type: none"> • Understand the degradation of natural resources by constructions of various projects. • Understand requirement of oxygen for growth of organisms to break down organic matter in wastewaters. • Describe the low cost wastewater treatment practices in water demand areas.
16	ENV-304	Practical-II	2020	<ul style="list-style-type: none"> • It helps to explain the relationships between variables of the real-world applications. • Develop the programming techniques and the problem solving skills through programming.
20	ENV-305A	Ecotourism and Eco-restoration	2020	<ul style="list-style-type: none"> • Describe the challenging in Eco-Tourism and wildlife tourism. • Understand values of wildlife and minimizing impact on natural

				<p>ecosystem due to tourism.</p> <ul style="list-style-type: none"> • It is joyful to public and society; Government economy also will be generated.
18	ENV-305B	Biodiversity Conservation and Management	2020	<ul style="list-style-type: none"> • Systematically understand biodiversity and its vital role in ecosystem function. • Understand the value of biodiversity and current threats to biodiversity. • Describe Environment of nature
20	ENV-305C	Statistics, Computer Applications and Modeling	2020	<ul style="list-style-type: none"> • Analyze data using standard statistical techniques. • Utilize the Internet Web resources and evaluate on-line e-business system. • Environmental analysis, forecasting of the environment can be achieved.
20	ENV-306A	Natural Resources Conservation	2020	<ul style="list-style-type: none"> • Apply theories and methods with interdisciplinary approach towards natural resource management. • Critically examine the gap in the resource availability, use and conservation. • In conservation of the environment, employment can be generated.
21	ENV-306B	Environmental Education and Sustainability	2020	<ul style="list-style-type: none"> • Demonstrate an integrative approach to environmental issues with a focus on sustainability. • Communicate complex environmental information to both technical and non-technical audiences.

				<ul style="list-style-type: none"> • Students will be enriched about the nature.
22	ENV-401	Water Resources and Watershed Management	2020	<ul style="list-style-type: none"> • Understand water's importance as a precious resource. • Provide a basic understanding of the impact of water and water-related issues in a global, economic, environmental and societal context. • Describe the management of water resources through construction of watersheds for future generations.
23	ENV-402	Remote Sensing and GIS	2020	<ul style="list-style-type: none"> • Building a foundation for understanding Remote Sensing and Geographic Information System (RS-GIS) as a powerful tool for geospatial analysis. • Appreciate the application of RS-GIS techniques to the matrices of environment and Resource management. • Future predictions of the environment will be known about weather, cyclones and research etc.,
24	ENV-403	Practical-I	2020	<ul style="list-style-type: none"> • Analyze the multi elements in various wastewater samples. • Understand the rain water harvesting practices. • Identify the water bodies and evaluate effective sensors and advance

				technique to extract and mapping the features for various applications.
25	ENV-404	Project Work and Comprehensive Viva-Voce	2020	<ul style="list-style-type: none"> • Understand project characteristics and various stages of a project. • Estimate and cost the human and physical resources required and make plans to obtain the necessary resources. • It helps to develop in contextualization of knowledge, critical thinking and can lead to new innovation ideas.
26	ENV-405 A	Disaster Mitigation and Management	2020	<ul style="list-style-type: none"> • Understand the mitigation approaches, their choices and alternatives. • Develop foundations for hazard, risk and vulnerability assessment.
29	ENV-405 B	Environmental Laws, Policies and Legislation	2020	<ul style="list-style-type: none"> • Understanding judicial response to environmental issues in India. • Acquire the ability to evaluate the role of law and policy in conservation and management of natural resources and prevention of pollution.
28	ENV-405 C	Global Environmental Issues	2020	<ul style="list-style-type: none"> • Predicting the consequences of human actions on the web of life, global economy and quality of human life. • Developing critical thinking for shaping strategies (scientific, social, economic and legal) for environmental protection and conservation of biodiversity, social equity and

				<p>sustainable development.</p> <ul style="list-style-type: none"> • International issues will be understood.
29	ENV-406 A	Forest Resources and Management	2020	<ul style="list-style-type: none"> • Demonstrate knowledge of forest vegetation modeling and the ability to forecast its development over time using models of forest growth. • Integrate knowledge of basic biology, physical sciences, forest and wildlife ecology, and social sciences into the stewardship of forest resources. • Through forest management national economy will be improved.
30	ENV-406 B	Environmental Management and Sustainable Development	2020	<ul style="list-style-type: none"> • Ability to analyze environmental management in relation to the major principles of sustainable development. • The ability to work effectively to create environmental management analysis outputs of professional quality, both independently and within team environments.

34. Fishery Sciences & Aquaculture

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	AQC 101	Concepts of Aquatic Ecology	2020	i. Understanding the General

				<p>Characteristics, Principles of classification, Aquatic EcologyCommunities.</p> <p>ii. To understand the various Physical and chemical characteristics of water.</p>
2	AQC 102	Systematics And External Anatomy of Cultivable Organisms	2020	<p>i. Understand the concepts of finfish and shellfish systematics and anatomy.</p> <p>ii.</p> <p>iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations, Natural Selection and Genetic drift.</p> <p>iv. Understood the concepts of Micro, Macro evolution speciation categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.</p>
3	AQC 103 A	Fish Nutrition and Water Quality Management	2020	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. Understanding the comparative</p>

				<p>aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in taxonomy related research and job opportunities.</p> <p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p>
4	AQC: 103 B	Environmental Monitoring and Bio deterioration	2020	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight into biological processes.</p> <p>iv. Understood that the four propositions</p>

				<p>underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
5	AQC- 104A	Coastal Aquaculture	2020	<p>i.The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of</p>

				Amino acids, inborn errors of metabolism.
6.	AQC 104 B	: Ornamental Fish Culture	2020	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
			2020	
7.	Practical-1 AQC 105	Identification and Morphology of Cultivable Organisms	2020	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the</p>

				<p>ultra-structural information of animal cell besides the detailed views of the cell interior revealing the various events and actions of cell at the molecular level.</p> <p>iii. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the principles of Graft rejection, Auto immunity and Antibody based therapy.</p>
8.	Practical-2 AQC106	Fish Nutrition	2020	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p> <p>ii. Students world gain expertise in understanding the complex molecular mechanisms</p>

				<p>occurring in cell and the applications of molecular technologies for betterment of life.</p> <p>iii. Understand and our apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the health Professions.</p>
9.	AQC 107	Human Values and Professional Ethics – I	2020	<p>i. Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they will also know the various tools and techniques related to bacterial microbiology.</p> <p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p>

10.	AQC 201	Principles of Aquaculture	2020	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fullest.</p> <p>iii. Learn the fundamental principles of immune response including molecular, biochemical and cellular basis of immune homeostasis.</p> <p>iv. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.</p>
11	AQC 202	Physiology of Cultivable Organisms	2020	<p>i. In depth understanding of Anatomical features of Integumentary, Circulatory, Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.</p> <p>ii. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary</p>

				<p>changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>iii. An appropriate understanding of functioning of each system of different groups of animals with their comparison will be acquainted.</p> <p>iii. Understanding of the basic concepts of Physiological regulation, from cellular to organ to organismal.</p> <p>iv. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet.</p>
12	AQC 203A	Fresh Water Aquaculture	2020	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>

13	AQC 203B	Capture fisheries	2020	<p>i. Students would gain expertise in explaining how a variety of interacting processes generate an organism's heterogenous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p> <p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity complex and coordinated systems in organisms the students can apply this knowledge for research, and education, to solve the problems related to development in animals through research.</p>
14	AQC 204 A	Fishery Economics, Extension and Environmental Management	2020	<p>i. Students will be able to apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.</p> <p>ii. Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental</p>

				<p>problems.</p> <p>iii. Students will be able to be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p> <p>iv. Students will be able to use technology, such as geographical information systems and computer programming, to assist in problem solving.</p>
15	AQC 204 B	Limnology	2020	<p>i. Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. Students would be expertise</p>

				<p>techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>iv. Students would gain basic knowledge of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study and understanding of life processes.</p>
16	Practical-1 AQC205	Soil and Water Characteristics	2020	<p>i. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to Education, Research and Extension programmes in his further career.</p> <p>ii. Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>iii. Students learn about enzymes. Their classification and nomenclature</p> <p>iv. Students learn about specificity of enzymes</p> <p>v. Students learn about measurement of</p>

				enzymatic activity vi. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.
17	Practical-2 AQC206	Physiology of Fin Fish and Shell Fish	2020	<p>i. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>ii. Identify and describe the different equipment and tools used in a biology laboratory.</p> <p>iii. Correctly operate different laboratory instruments.</p> <p>iv. Correctly operate different types of microscopes.</p> <p>v. Prepare tissue for section cutting and correctly operate a microtome.</p>
18	AQC 206	Human Values and Professional Ethics – II (Audit course)	2020	<p>i. Students gain knowledge about regulation of enzyme activity with respective mechanisms</p> <p>ii. To understand about mechanism of enzymes in clinical diagnosis and their applications</p> <p>iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.</p>

19	AQC 301	Microbiology and Fish Pathology	2020	<p>i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology.</p> <p>ii. Describe different methods of data handling using computer.</p> <p>iii. Perform basic operations of gene sequence retrieval and compare them using different software.</p> <p>iv. Perform basic operations of protein structure retrieval and comparison using different software.</p> <p>v. The student will learn about the Computer basics like Operating systems, Programming, Data Access, Internet and Nucleic acid Sequence and Protein Data Banks.</p> <p>vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of dispersion like Mean deviation and Standard deviation and Co-efficient of Variation.</p> <p>v. The course will aid in learning Test of significance like Null hypothesis and</p>

				Alternative hypothesis, t-test, F-test, Chi-square test, Correlation and Regression analysis.
20	AQC 302	Fish Immunology	2020	<p>i. Creating the self-employment opportunities to rural students through Animal husbandry, Aquaculture, Vermiculture and Sericulture.</p> <p>ii. To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices.</p> <p>iii. Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.</p>
21	AQC: 303A	Cell Biology and Genetics	2020	<p>i. To understand the different pathogens causing disease in man.</p> <p>ii. Describe the different parasites causing disease and disability in man and animals.</p> <p>iii. Ability to elaborate about the life cycle and biology of disease carrying vectors; suggest preventive and control measures for the said diseases.</p> <p>iv. An understanding of the relationship</p>

				<p>between changes in physiology of host and</p> <p>v. The students after completion of the course based on the Expertise he/she may join as</p> <p>Parasitological Scientist.</p>
22	AQC 303 B	Bioinformatics In Aquaculture	2020	<p>i. Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment</p> <p>ii. Explain the importance of environmental audits and other management tools in business for social benefit by improving environmental performance</p> <p>iii. Calculate the carbon footprint of any organization and identify suitable mitigation strategies for carbon reduction solutions.</p>
23	Practical's AQC 304	Microbiology and Fish Diseases	2020	<p>i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials</p> <p>ii. Students learnt and gain knowledge on structure and function of different types of Synapses</p> <p>iii. Gained information on different types of Neurotransmitters i.e. Amino acids and</p>

				Peptides.
24	Skill oriented course AQC 305	Fish Nutrition Technology	2020	<p>i. The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research.</p> <p>ii. Understanding of the physiological and genotoxic effects of drugs and environmental toxins.</p> <p>iii. To understand various types of insecticides and understand their mode of action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible with other control strategies.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p>
25	Open Elective (For	a)AQC 306A: Fish Processing Technology	2020	i. Learnt about structure, function and organization of Neurons in the Central

	other department students)	b) AQC306B: Pollution and Toxicology		<p>nervous system</p> <p>ii. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials.</p> <p>iii. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny.</p> <p>iv. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effectively communicate with both specialist and non-specialist audiences/community.</p>
26	AQC 401	Aquaculture Biotechnology	2020	<p>i. Skill development in environmental and occupational Toxicology.</p> <p>ii. It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain.</p> <p>iii. Identification of different routes of exposure of environmental toxins.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p> <p>v. To understand the overview of Animal</p>

				<p>Behavior and prominence of social organization in insects and primates.</p> <p>vi. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>vii. To understand how to conserve the wild animals</p>
27	AQC402	Essentials Of Biochemistry	2020	<p>i. Understanding of in vitro culturing of organisms and production of transgenic animals.</p> <p>ii. Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors.</p> <p>iii. This insight allows students to take into consideration about ethical issues involved in production of transgenic animals and BT products.</p> <p>iv. Use in gene transfer technology, genetic manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p> <p>v. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny</p>

				<p>vi. Classify the nutritional types of microorganisms and measure microbial growth</p> <p>vii. Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>viii. Assess impact of plant- microbe interaction on agriculture in both beneficial and detrimental ways. Identify industrially important microbes.</p>
28	AQC403A	Computer Applications, Information Technology And Biostatistics In Aquaculture	2020	<p>i. Understand the overview of Animal Behavior and prominence of social organization in insects and primates</p> <p>ii. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>iii. To understand the how to conserve wild animals and management strategies.</p> <p>iv. To gain the knowledge about wild animals and animal products importance.</p>
	AQC403B	Aquaculture Engineering		
29	Practical's AQC 404	Biotechnology And Biochemical Estimations	2020	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic pathways.</p>

				<p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
30	<p>Multidisciplinary course/ project work AQC405</p>	<p>Project Work / Fieldwork</p>	2020	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p> <p>ii. Students will be able to perform basic genetic engineering experiments at the end of course.</p> <p>iii. Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.</p>
31	<p>Open Elective (For other department students) AQC 406(A)</p>	<p>General Principles and Practices of Aquaculture</p>	2020	<p>i. Understand the evolution of protein structural motifs and domains and associate this with function;</p> <p>ii. Use on-line structural databases and tools to predict the properties, structure and function of proteins.</p> <p>iii. Understand and explain enzyme mechanisms in a structural context.</p> <p>iv. Describe mechanisms of protein folding and the roles of natively unstructured proteins in biology.</p> <p>v. Understand how cross-talk between proteins and post-translational protein</p>

				modifications (e.g. phosphorylation, ubiquitination) facilitate information processing in cells.
32	AQC 406 (B)	Fish Breeding and Hatchery Management	2020	<p>i. To understand the basic concepts of Infectious diseases and the role of immunity to control infections</p> <p>ii. Provides knowledge on the physiological mechanisms leading to diseased conditions.</p> <p>iii. Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv. This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>

35. Geography

S. N o.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	GEG-101	Geomorphology	2020	<ul style="list-style-type: none"> • To understand the concept of place and how it is connected to people's sense of belonging to the physical environment, landscape and culture. • To understand the fundamental concepts of spatial interaction and diffusion, which explain how human activities are influenced by the concept of distance. • To exposed to the nature of physical systems such as geomorphologic proc

				<p>esses and natural hazards.</p> <ul style="list-style-type: none"> • To read and interpret information on different types of physical features maps. • To learn how human, physical and environmental components of the world interact.
2	GEG-102	Economic Resource Studies	2020	<ul style="list-style-type: none"> • To acquire knowledge about the concepts of resources, classification, models of natural resource processes, their use and misuse, conservation and management of resources for sustainable development • To Provide a comprehensive introduction to basic concepts and key theoretical approaches in economic geography • To Introduce economic geography as a dynamic, diverse and contested body of knowledge • To enable you to apply this knowledge to key social and economic issues in the context of economic globalization
3	GEG-103P	Maps Scales and Map Projections	2020	<ul style="list-style-type: none"> • To apprise the students about the art and science of map making and representation. • To explain the usage of different types of projections • To focus on the importance of scale and projection in the process of representing the earth's surface
4	GEG-104P	Terrain Mapping	2020	<ul style="list-style-type: none"> • To apprise the students about the Terrain mapping techniques • To project the representation of the land forms by using contour lines

		Techniques		<ul style="list-style-type: none"> • To explain the methods of slope analysis • To develop the knowledge on the thematic maps • To Understand the data representation through the diagrammatic form and logographs
5	GEG-105	Advanced Cartography	2020	<ul style="list-style-type: none"> • To apprise the student to various aspects of cartography. • To introduce the basic concepts and key theoretical approaches in Advanced Cartography. <p>To describe the art and science of mapmaking and map analysis</p>
6.	GEG-106	Human Values and Professional Ethics-I	2020	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society</p>
7.	GEG-201	Climatology and Oceanography	2020	<ul style="list-style-type: none"> • To introduce to the student the fundamentals of atmospheric phenomena, global climate systems and climate change. • The atmosphere and climate are a critical part of the earth system, and climatic variability and change are central to the issue of current and future global environmental change. • To grasp the techniques for modeling the climate, covering both theoretical and technical aspects. • To understand the dynamics of the atmosphere and the overall climatological system. • To be able to analyse and interpret climatic data and classification of climate

8.	GEG-202	Principles of Remote Sensing	2020	<ul style="list-style-type: none"> <input type="checkbox"/> To focus on history and evolution of Remote sensing. <input type="checkbox"/> To explain the principle involved in remote sensing i.e. the Electromagnetic spectrum, reflection, refraction, diffusion, absorption and interaction with earth's atmosphere. <input type="checkbox"/> To give the technical knowledge of satellite system. <input type="checkbox"/> To provide knowledge on the platforms and instruments used for remote sensing. <input type="checkbox"/> To give light on Aerial Remote sensing and satellite Remote sensing. <p>To explain about the specifications of sensors</p>
9.	GEG-203P	Interpretation of topographical and Weather Maps	2020	<ul style="list-style-type: none"> • To provide understanding and interpretation Skills of different Topographical maps. • To improve the knowledge on Indian weather maps and Interpretation skills.
10.	GEG-204P	Techniques of Mapping and Map Analysis	2020	<ul style="list-style-type: none"> • To apprise the students about the Terrain mapping techniques • To project the representation of the land forms by using contour lines • To explain the methods of slope analysis • To develop the knowledge on the thematic maps
11	GEG-205	Geographical Thought	2020	<ul style="list-style-type: none"> • To acquaint the students with the Geographical philosophy and the Methodology and historical development of geography as a professional field.

				<ul style="list-style-type: none"> • The idea is to address the spirit and purpose of the changing geographies and to what we as geographers contribute towards knowledge production. • To developing critical thinking and analytical approaches and Students will acquire an understanding of and appreciation for the contributions of the eminent geographers to the subject.
1 2	GEG- 206	Human Values and Professional Ethics-II	2020	<p>Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
1 3	GEG- 301	Urban Studies	2020	<ul style="list-style-type: none"> • To deal with the concept of urban settlements and devolution of urban population and to provide concept of Urban studies. • To explain the cause and effects of growth in urban population. • To explain the theories involved in classification of towns and relationship between towns and cities and their population. • To understand patterns of World urbanization with reference to India
1 4	GEG- 302	Geographical Information	2020	<ul style="list-style-type: none"> • To understand the evolution of GIS. • To focus on collection, analyzing, interpretation and resen

		System(G.I.S)		<p>tingthedatarelatedtoEarth.</p> <ul style="list-style-type: none"> • ToexplainsthetypesofdatacollectionwithrespectivetotimeandterrainandDatabasemanagementandretrievingthedatafromdifferentsources. • ToprovidesthetheoreticalknowledgeontheModelingsurfacesandintegrationofRemotesensingwithGIS. • ToprovideknowledgeonGISapplicationsindifferentsectors.
1 5	GEG- 303P	Geographical Information System(G.I.S)	2020	<ul style="list-style-type: none"> • ToacquaintknowledgeaboutespeciallyGeographicInformationSystem(GIS)softwares. • Todeveloptheskillofgeo-referencingandcreationofdifferentdatafiles. • Toimprovethepracticalknowledgeonattributedataandlinkage. • TodeveloptheskillonanalysismethodsofGIS.
1 6	GEG- 304P	Statistical Techniques	2020	To analyze and represent the geographical data
1 7	GEG- 305A	Agricultural Studies	2020	<ul style="list-style-type: none"> • TofocusonevolutionofAgriculturethroughatthedifferentagesandapproaches. • Tounderstandtheconceptsandimportanceofdeterminantsindifferentcroppingpatterns. <p>To understand agricultural allocation theories also the problem and prospect of Indian Agriculture</p>
1 8	GEG- 305B	Regional Geography of India with	2020	<ul style="list-style-type: none"> <input type="checkbox"/> TodeveloptheunderstandingaboutphysicalfeaturesofIndianGeography. <input type="checkbox"/> Tofamiliarizethestudentswithphysiography,Drainage,Climate,s

		special reference to Andhra Pradesh		oil and natural vegetation of India.
19	GEG-305C	Disaster Management Studies	2020	<input type="checkbox"/> To develop the skill of understanding about natural calamities and disaster and also realize the consequences as well as preparedness. <input type="checkbox"/> To create awareness on human and natural disasters <input type="checkbox"/> To understand classification of disasters and its impacts
20	GEG-306A	Regional Geography of Andhra Pradesh	2020	<ul style="list-style-type: none"> • To acquaint the students with re-organization of Andhra Pradesh and its new physical, climate and drainage aspects.. • To obtain the knowledge of demographic, irrigation and major crops. • To understand Andhra Pradesh mineral and industrial aspects with transportation. • To improve knowledge on the transportation and communication aspects of Andhra Pradesh
21	GEG-306B	Geographical information System(GIS) and Global Positioning System(GPS) applications	2020	<ul style="list-style-type: none"> • To develop the skill of understanding GPS and Survey. • To create awareness on post processing of GPS data and collection of data from GPS survey. • To develop skill of report writing by using GPS data and software and hardware To acquaint knowledge about especially Geographic Information System(GIS) softwares. • To develop the skill of geo-referencing and creation of different data files.

				<ul style="list-style-type: none"> • To improve the practical knowledge on attributed data and linkage. • To develop the skill on analysis methods of GIS.
2 2	GEG-401	Regional Planning	2020	<ul style="list-style-type: none"> <input type="checkbox"/> To apprise the concept of Region and its planning. <input type="checkbox"/> To explain the types of regions and regional hierarchy. <input type="checkbox"/> To explain the types of regional planning and planning process. <input type="checkbox"/> To the people participation in planning process and role of Panchayat Raj system <input type="checkbox"/> To explain the resource based and physiographic based regional planning.
2 3	GEG-402	Advanced Remote Sensing	2020	<ul style="list-style-type: none"> • To give broad knowledge on photogrammetry, Principle, process, platforms and techniques and Aerial photographs. • To provide knowledge on software and hardware required for digital image processing, image enhancement and restoration techniques. • To understand the application of remote Sensing and Photogrammetry in various fields of study.
2 4	GEG-403P	Research Techniques	2020	<ul style="list-style-type: none"> • To provide an understanding for the student on statistical concepts to include measurements of location and dispersion, and correlation analysis. • To calculate and apply measures of location and measures of dispersion--grouped and ungrouped data cases. <p>To sensitize the different Research and agricultural techniques</p>
2 5	GEG-404P	Remote Sensing	2020	<ul style="list-style-type: none"> <input type="checkbox"/> To explain practical knowledge on Remote sensing applications... <input type="checkbox"/> To help to understand Visual and digital interpretation of satellite Images. <input type="checkbox"/> To illustrate interpretation of Aerial photos.

		Applications		ToacquaintknowledgeonallocationofRSindifferentfieldsandsectors
2 6	GEG- 405A	Water and Soil Resource Management	2020	<ul style="list-style-type: none"> • Toapprisethestudentstovariouswaterresourcesrelatedaspectsandhydrologicalcycle. • Tofocusongroundwaterandsoilspecifications. <p>To develop skill of water and soil management and to study on some case studies</p>
2 7	GEG- 405B	Environmental Studies	2020	<ul style="list-style-type: none"> • Tocreathetheenvironmentalaptitudeamongstudents. • Tofamiliarizethestudentswithconcepts,issues,approachesaboutphysicaland • Toacquaintedwithcontemporaryenvironmentalproblemsandchallenges. <p>To provide knowledge on Ecosystem, Biomes, food chain and hydrological cycle</p>
2 8	GEG- 405C	Geography for Research Extension and industry	2020	<ul style="list-style-type: none"> <input type="checkbox"/> Toexplainthehistoricalevolution,ofresearchinGeographicalstudies. <input type="checkbox"/> Tohelptounderstandaboutethics,methodsandfactorsingeographicalresearch. <input type="checkbox"/> Toprovidetheknowledgeaboutformsofresearchanddesign. <input type="checkbox"/> Toillustrateresearchmethodsanddatacollection. <p>Toacquaintresearchanalysisandreportwriting</p>
2 9	GEG- 406A	Regional Geography of India	2020	<ul style="list-style-type: none"> • Toconceptualizetheregionalapproachesandtoexamine regionaldifferentiationinthestudyofIndianGeography. • Toexposetohistorical,economic,cultural,socialandphysicalcharacteristicsofIndia. <p>To provide an introduction to the regions of the India in terms of both their uniqueness and similarities</p>
3 0	GEG- 406B	Remote sensing Principles and	2020	<ul style="list-style-type: none"> <input type="checkbox"/> ToexplainpracticalknowledgeonRemotesensingapplications... <input type="checkbox"/> TohelptounderstandVisualanddigitalinterpretationofsatelliteImages. <input type="checkbox"/> ToillustrateinterpretationofAerialphotos.

		Applications		
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36. Geology

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	GEO-101	Geomorphology and Paleontology	2020	<p>1) Able to explain conceptual approaches in geomorphology.</p> <p>2) Able to describe land forms and land forming processes in different climate zones and tectonic regimes.</p> <p>3) Able to explain different theories and models for landscape evolution.</p> <p>4) Obtain knowledge in recognizing and minimizing the mass wasting.</p> <p>5) Able to apply geomorphological concepts in economically important projects.</p> <p>6) <i>Palaeontology</i> is the study of prehistoric species, mostly ones that are extinct. It focuses primarily on fossil data, using a variety of physical, chemical and biological.</p> <p>7) Paleontology has essentially three basic goals: (1) to describe the world's past biodiversity; (2) to outline the history of life on earth; and (3) to develop new ideas about evolution and ecology.</p>
2	GEO-102	Crystallography & Mineralogy	2020	<p>1) Students will be able to describe crystal structures, crystal symmetry and twinning</p> <p>2) Students will learn the use of X-ray crystallography to determine the arrangement of atoms in a crystal.</p>

				<p>3) Students will be able to identify the mineralogical composition of geological materials by studying some of the optical properties and techniques in order to reveal their origin and evolution.</p> <p>4) Students will get thorough knowledge about the physical chemical and optical Characteristics of minerals could lead to the discovery of new uses for Earth's mineral resources.</p>
3	GEO-103P	Crystallography & Mineralogy	2020	<p>1. The student understands the importance of minerals to society and to the study of the Earth.</p> <p>2. Can explain how the properties of chemical elements and their bonds regulate the structure and composition of minerals.</p> <p>3. Demonstrate how the crystal structure of minerals affects the external morphology and physical properties of a mineral (e.g. crystal symmetry, crystal habit).</p> <p>4. Identify various minerals using Physical properties.</p> <p>5. Identify various crystal forms shown by minerals belonging to different crystal system.</p>
4	GEO-104P	Geomorphology & Paleontology	2020	<p>1) The practical application of geomorphological science now forms river restoration and environmental protection.</p> <p>2) the extensive experience gained through field work, analysis and input to the design process to provide thorough understanding of geomorphology in the river environment and describe</p> <p>3) Paleontology is highly relevant to the modern and future world. We can learn how climate change has effected past organisms as well as how organisms have changed the physical world. We can also better understand the principles of extinction, evolutionary change, and biodiversity.</p> <p>4) Paleontological resources, or fossils, are any evidence of past life preserved in geologic context. They are a tangible connection</p>

				<p>to life, landscapes, and climates of the past. They show us how life, landscapes, and climate have changed over time and how living things responded to those changes.</p> <p>5) Paleontology lies between biology and geology since it focuses on the record of past life, but its main source of evidence is fossils in rocks.</p> <p>6) paleontology, also spelled paleontology, scientific study of life of the geologic past that involves the analysis of plant and animal fossils, including those of microscopic size, preserved in rocks.</p> <p>7) Body fossils and trace fossils are the principal types of evidence about ancient life, and geochemical evidence has helped to decipher the evolution of life.</p>
5	GEO-105	Stratigraphy & Paleontology	2020	<p>1) Students would have acquired comprehensive knowledge on principles of Stratigraphy, correlation methods classification of Stratigraphy units, tectonic framework of India and Geological timescale.</p> <p>2) Ability to give an account of various stratigraphic units and give stratigraphic column distribution in India, fossil content and economic importance of given geological formation.</p> <p>3) Apply standard stratigraphic codes while preparing geological reports</p> <p>4) Describe morphology, classification, evolutionary trends of Invertebrate fossils with geological and geographic distribution and paleoecological and paleo-environmental relevance.</p> <p>5) Ability to identify, classify and describe the morphology of the invertebrate fossils and plant fossils.</p>

				<p>6) Application of fossils in establishing the age of the rockunit, correlation with other area, and Use of fossil in finding mineral deposits.</p> <p>7) Ability to apply micropalaeotological techniques in hydrocarbon exploration.</p>
6.	GEO-106	Human Values & Professional Ethics-I	2020	<p>1) After completion of this course the students will be able to know the importance of Ethics and Human Values in various professions.</p> <p>2) Students also will get in depth knowledge and understanding of moral values and ethical code of the Indian Society. Especially embedded in various scriptures.</p>
7.	GEO-201	Structural Geology and Geotectonics	2020	<p>1) Able to demonstrate a basic understanding of stress, strain, rheology of earth's lithosphere and comprehend how to describe and classify brittle and ductile structures.</p> <p>2) Able to describe, identify and analyze the folds, faults and joints and their effects on outcrop pattern.</p> <p>3) Measure, plot and interpret structural field data and can relate these to geological Maps and knows how to read geological maps and geological cross-section.</p> <p>4) Obtain knowledge of shear zone characteristics and textures which are usually highly, Mineralized zones.</p>
8.	GEO-202	Remote Sensing and GIS	2020	<p>1) Develop knowledge in basics of Remote Sensing interpretation keys and applications.</p> <p>2) Formulate the relationship between EMR and satellite Remote Sensing.</p>

				<p>3) Application for Remote Sensing for important economic deposits.</p> <p>4) Operate GIS data model and demonstrate GIS techniques for various applications.</p> <p>5) Apply RS and GIS techniques to analyze the various geological materials.</p>
9.	GEO-203P	Structural Geology & Sedimentology	2020	<p>1) The interpretation of geological maps and determination of strike and dip, Borehole problems and apparent dip, plunge and pitch of linear structures</p> <p>2) Structural geology concepts and tools to understand rocks deformation in hot environments</p> <p>3) Structural geology with interpretations and simple geomechanical problems and solutions</p> <p>4) Structural geology issues related to new instruments in measuring structural data from rocks, paleomagnetic studies in tectonics field studies in structural geology interdisciplinary aspects of structural geology.</p> <p>5) Sedimentology encompasses the study of modern sediments such as sand, silt, and clay, and the processes that result in their formation (erosion and weathering), transport, deposition and diagenesis.</p> <p>6) Sedimentology, the study of sedimentary rocks and the processes by which they are formed, includes and is related to a large number of phenomena.</p> <p>7) Sedimentology includes the five fundamental processes defined by the term sedimentation --weathering, erosion, transportation, deposition and diagenesis.</p>
10.	GEO-	Remote	2020	1. Understand the concepts of Photogrametry and compute the

	204P	Sensing and GIS		<p>heights of objects</p> <p>2. Understand the principles of aerial and satellite remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies.</p> <p>3. Understand the basic concept of GIS and its applications, know different types of data representation in GIS.</p> <p>4. Understand and Develop models for GIS spatial Analysis and will be able to know what the questions that GIS can answer are.</p> <p>5. Apply knowledge of GIS software and able to work with GIS software in various application fields.</p> <p>6. Illustrate spatial and non spatial data features in GIS and understand the map projections and coordinates systems.</p> <p>7. Apply knowledge of GIS and understand the integration of Remote Sensing and GIS.</p>
11	GEO-205	Sedimentology	2020	<p>1) Able to identify different sedimentary rocks in both hand specimens and thin section and derive information on the depositional conditions and environments.</p> <p>2) Able to study the sequence of sedimentary rock strata and describe the tectonic framework of sedimentation to understand the earth's history including palaeoclimatology and history of life</p>
12	GEO-206	Human Values & Professional Ethics-II	2020	<p>1) After completion of this course the students will be able to follow and practice good behaviour with human values and moral support to their elderly family members.</p> <p>2) They also aware and get knowledge about medical ethics how the doctors will behave with patients, what type of ethics should be followed by business people. They also get in through knowledge about the protection of environment social ethics like</p>

				family ethics, the role of print and electronic media in prevention and protection of Human rights in Indian society.
13	GEO-301	Igneous Petrology	2020	<ol style="list-style-type: none"> 1) Acquire knowledge on the evolution of magma by different processes takes place from origin to emplacement with respect to different tectonic settings. 2) Explain Igneous processes, formation, structures, classification and significance of texture in explaining rock history. 3) Obtain knowledge on the crystallizing phase equilibrium of multi component magma system. 4) Identify different Igneous rocks both in handspecimens and thin sections in terms of their petrogenesis by studying the petrographic characteristics.
14	GEO-302	Metamorphic Petrology	2020	<ol style="list-style-type: none"> 1) This course has links directly with industry and share the knowledge about a wide range of ore deposits. 2) Offers a detailed study of origin of economic mineral deposits its identification properties and distribution in India. 3) Comprehensive knowledge in reflection light optic and ore textures.
15	GEO-303P	Petrology	2020	<ol style="list-style-type: none"> 1) Describe the types and relative abundances of phases in a rock based on observations from hand specimens and thin sections 2) Interpret the geologic history of igneous rocks based on mineral assemblage and textures using both hand sample and microscope techniques 3) Use metamorphic mineral assemblages and textures to constrain deformation history and P-T conditions 4) Use geochemical data (partition coefficients, REE plots, etc)

				<p>to constrain petrogenetic processes</p> <p>5) Integrate their research findings with those of peers in developing a consensus model that (a) explains mineral occurrences and interplay (micro- and macroscopic) in field samples, and (b) holds up to public scrutiny (as a consensus model and as individual components) at a departmental mini-poster symposium</p> <p>6) Design and implement a field sampling campaign</p> <p>7) Use a portable X-Ray Fluorescence Spectrometer to collect elemental analyses</p> <p>8) Use MS Excel to organize, plot, and evaluate the petrogenesis of CRB using elemental data</p>
16	GEO-304P	Geochemistry	2020	<p>1) Geochemistry can play a key role in helping to protect the safety of drinking water by identifying the sources, concentration and forms of potentially harmful elements such as arsenic mercury and fluoride in natural water.</p> <p>2) Geochemistry and health establishes and explains links between the natural or disturbed chemical composition of the earth's surface and the health of plants animals and people.</p>
17	GEO-305	Geochemistry and Thermodynamics	2020	<p>1) Understand the behavior of elements in a geochemical context and relate this knowledge to how elements redistribute within the Earth.</p> <p>2) Learn to interpret and explain interactions between Earth reservoirs.</p> <p>3) Understand and interpret the major processes that form and modify the Earth's crust and mantle.</p>

				4) Use isotopes to trace geological processes and age date specific events.
18	GEO-306	Computer Applications and Geostatistics	2020	1) Comprehend the database related to field geological data 2) Prepare and Interpret graphical and pictorial data 3) Exposure to some selected software's related to geology
19	GEO-307	Dimensional Stones and Building Materials	2020	1) Explain the distribution of dimensional stones and occurrence of construction materials 2) Classify dimensional stones and construction materials 3) Assess the suitability of various dimensional stones and construction materials
20	GEO-308	Gemology	2020	1) The course is focused on a comprehensive learning in gemology 2) Understands the formation, classification and properties to final the grading and evaluation. 3) Knowledge in order to identify original gemstones and stimulants 4) Acquire skills which will be useful to them in gem industry
21	GEO-309	Surveying and Field Geology	2020	1) Understand the use of different surveying instruments, field equipment, aerial photographs and their use. 2) Compute the area and earthwork for different works by using surveying instruments 3) Analyze surveying techniques, tools, survey data and geological reports 4) Prepare contour maps, geological maps and reports 5) Solve survey issues using proper survey and interpretation.

				6) Use appropriate modern tools in surveying and mapping
22	GEO-401	Economic Geology	2020	<p>1) Its chief objective is to guide the exploration for mineral resources and help determine which deposits are economically worthwhile to mine. Specialists in economic geology often assist in the extraction of the mineral commodities as well.</p> <p>2) <i>Economic geology</i> is concerned with earth materials that can be used for economic and/or industrial purposes. These materials include precious and base...</p> <p>3) Scientific <u>discipline</u> concerned with the distribution of mineral deposits, the economic considerations involved in their recovery, and an <u>assessment</u> of the reserves available.</p> <p>4) Economic geology deals with metal ores, fossil fuels (<i>e.g.</i>, <u>petroleum</u>, <u>natural gas</u>, and coal), and other materials of commercial value, such as salt, gypsum, and building stone. It applies the principles and methods of various other fields of the geologic sciences, most notably <u>geophysics</u>, <u>structural geology</u>, and <u>Stratigraphy</u>. Its chief objective is to guide the exploration for mineral resources and help determine which deposits are economically worthwhile to mine. Specialists in economic geology often assist in the extraction of the mineral commodities as well.</p>
23	GEO-402	Mineral Exploration, Mining & Engineering Geology	2020	<p>1) This course linked to industry and acquires knowledge on techniques to locate ore bodies, methods for mineral exploration and geologic aspects of drilling.</p> <p>2) Acquire knowledge on geophysical methods for Ore reserve estimation.</p> <p>3) Acquire knowledge on Ore beneficiation processes and</p>

				<p>techniques.</p> <ol style="list-style-type: none"> 4) Confirm mining rules and regulations 5) Able to determine the suitable mining methods 6) Analyse different ores and ore beneficiation processes. 7) Understand the different engineering properties of rock types and role of geologists in selecting the sites for different major engineering projects.
24	GEO-403P	Economic Geology	2020	<ol style="list-style-type: none"> 1) This course has links directly with industry and share the knowledge about a wide range of ore deposits. 2) Offers a detailed study of origin of economic mineral deposits its identification properties and distribution in India. 3) Comprehensive knowledge in reflection light optic and ore textures. 4) Acquire practical knowledge on microchemical techniques for identification ores and estimation of ore reserves.
25	GEO-404P	Project Work	2020	<ol style="list-style-type: none"> 1) The project is an effort using topographical maps suggest the view of Kurnool and Mahaboobnagar district. 2) Elevation is gradually increasing from South to North in study area, the lowest topography 300m observed in southern portion of study area and highest elevation of 430m is noted in the northern portion of study area. 3) Land features covering mostly by forest area yellow colour representation of topo map suggest crop lands. 4) The river patterns and drainage pattern are studied by using trace thematic method suggests that its are mostly covering hard rock terrain. 5) The rivers and lakes are mostly dried and lakes are scattered throughout the district.

26	GEO-405	Hydrogeology	2020	<ol style="list-style-type: none"> 1) Apply the knowledge of geological formations and the hydrological properties of rocks 2) Analyze the suitability of water for domestic, irrigation and industrial purposes Conduct geological and geophysical investigations and give recommendations for drilling of borewells. 3) Explain causes of pollution of groundwater give remedial measures to the society. 4) Use modern methods and appropriate techniques to carrying out geophysical studies and artificial recharge methods 5) Students will get critical knowledge on evaluation of geological condition at the major engineering project sites.
27	GEO-406	Environmental Geology & Natural Hazards	2020	<ol style="list-style-type: none"> 1) Explain different aspects of environment and local, regional and global environmental problems. 2) Classify and explain the environmental pollution and disaster control technologies 3) Prepare, interpret and implement environment projects 4) Identify the natural and environmental disasters, its causes and apply preventive measures. 5) Adopt the laws and regulations towards hazard management 6) Able to prepare controls of mitigating toward natural disasters.
28	GEO-407	Water Shed Management	2020	<ol style="list-style-type: none"> 1) Explain the importance of watershed management 2) Classify and explain the different water harvesting techniques 3) Use modern tools for land erosion control 4) Develop or improve the people's participatory approach for sustainable development and management of watersheds.
29	GEO-408	Medical Geology	2020	<ol style="list-style-type: none"> 1) Explain about relationship of human Health and Geological Processes.

				<p>2) Able to understand the importance of the Water quality standards and impact of micronutrient deficiencies in soils and crops on human health</p> <p>3) Analyse the interaction of abundance of elements and geological effects.</p>
30	GEO-409	Fuel Geology	2020	<p>1) The course offers a detailed study about natural fuels like coal and petroleum their formation and distribution especially in sedimentary basins.</p> <p>2) Students shall benefit to have basic ideas about formations, nomenclature in constitution of coal working detail of distribution of coals and coal industry in India, Sufficient idea of formation and entrapment of oil and gas.</p> <p>3)Get elaborate knowledge about occurrence of atomic minerals in nature, methods of prospecting, atomic fuels and environment.</p>

37. Home Science

Food Science Nutrition & Dietetics

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship /Skill development
1	FSN D	Food Chemistry and	2020	I. Acquire knowledge on chemical composition physical, chemical, and functional properties of Water, carbohydrate, Protein and Fats.

	101	Analysis		<ul style="list-style-type: none"> II. Understand the principles and working applications of different analytical techniques associated with food. III. Perform skills in qualitative and quantitative estimation of nutrients in different foods. IV. This course gives an hands on experience which will help student to become food analyst at local, regional, national and global levels.
2	FSN D 102	Food Science and Experimental	2020	<ul style="list-style-type: none"> I. Acquire knowledge on Plant and Animal foods composition, and processing techniques on nutritive quality of foods. II. Understand the principles of cookery of different foods and methods of evaluation. III. This course is prerequisite for skill development in Food Product development. IV. Standardization and experimentation on different foods leading to physical, chemical and sensory changes can be understood leading to become food research analyst in industries at local, regional, national levels.
3	FSN D 103	Clinical Nutrition and Dietetics-I Foods	2020	<ul style="list-style-type: none"> i. Understand the concepts of nutrition and its relation to health. ii. Describe the role and responsibilities of Dietitian in Hospital. iii. Apply Knowledge related to Therapeutic modification of diets and Plan and prepare diet for different diseases conditions. iv. This will help the students to get placements in hospitals and also start their own diet and nutrition clinics.
5	FSN D 107	Essential of Food and Community Nutrition	2020	<ul style="list-style-type: none"> I. Understand about nutrients in food, their functions and consequences of deficiency. II. Apply skills for planning diets for nutritional disorders like PEM, Iron, Vitamin A and Iodine. III. Develop the knowledge of techniques to assess the nutritional status of different age groups.

				IV. Acquire knowledge on government programs to prevent nutritional disorders according to regional and national needs.
6	FSN D 104	Food Chemistry and Analysis Practical	2020	I. Develop skills in quantitative and qualitative analysis of food.
7	FSN D 105	Food Science and Experimental Foods Practical	2020	I. Apply skills in standardization of foods using different processing techniques. II. Acquire skills in processing, preparation and evaluation of bakery products.
8	FSN D 106	Clinical Nutrition and Dietetics-I Practical	2020	I. Acquire hands on experience in Therapeutic modifications of diet for different diseases by planning, preparing and evaluating. II. Acquire community assessment skills in terms of anthropometry, dietary, clinical and biochemical for various disorders and planning programs for important days. III. Apply Computational skills in the Nutritional allowances during life span.
9	FSN D 107	Human Values and Professional Ethics-I	2020	I. Define the term 'ethics' , 'good and bad values', crime and punishment and religioustolerance. II. Understand the importance of good character, conduct and values embedded in various religions. III. Apply knowledge ofprofessional ethics and correlate the concepts in addressing the ethical issues outside the class room . IV. Demonstrate knowledge of ethical values in non-class room activities, internships and field work and resolve the moral issues. .
10	FSN D 201	Nutritional Bio chemistry	2020	i. Understand the metabolism of nutrients such as carbohydrates, proteins, lipids, minerals and vitamins in human physiology. ii. Acquire knowledge on factors affecting digestion, absorption of

				<p>nutrients.</p> <p>iii. Create awareness on enzymes and its role in nutrient metabolism.</p> <p>iv. Gain knowledge on role of vitamins and minerals as coenzymes in metabolism.</p>
11	FSN D 202	Food Microbiology and Safety	2020	<p>i. Acquire knowledge about important genera of microorganisms associated with food.</p> <p>ii. Acquaint with food contaminants and their sources.</p> <p>iii. Understand the various factors associated with growth, food spoilage and food-borne diseases of different microorganisms.</p> <p>iv. Gain knowledge on the characteristics of food borne diseases, infections and intoxications and their identification.</p>
12	FSN D 203	Clinical Nutrition and Dietetics-II	2020	<p>i. Understand the concepts of dietary principles for various diseases.</p> <p>ii. Comprehend knowledge in Dietary modifications for the management of diseases.</p> <p>iii. Application of principals in preparation and service of diets to the patients.</p> <p>iv. Able to assess the case studies and construct the diet charts.</p>
13	FSN D 204	Nutritional Bio chemistry Practical	2020	<p>i. Develop skill and hands on experience in analysis of biochemical parameters in blood and serum.</p>
14	FSN D 205	Food Microbiology and Safety Practical	2020	<p>i. Demonstrate and develop skills in the use of standard methods and procedures for the microbiological analysis of food</p>
15	FSN D 206	Clinical Nutrition and Dietetics-II Practical	2020	<p>i. Application of principals in preparation and service of diets to the patients.</p> <p>ii. Able to assess the case studies and construct the diet charts.</p>
16	FSN	Research	2020	<p>i. Understand the concept of doing research about terms like ‘variables’,</p>

	D 207	Methodology		<p>‘hypotheses, and ‘research</p> <ul style="list-style-type: none"> ii. Gain knowledge on different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research. iii. Critically gain knowledge to select a sample by using different sampling methods like probability and non-probability sampling. iv. Develop a research proposal in the appropriate scientific style. v. Critically apply knowledge of application of statistics in data analysis. vi. Apply skills in using computer applications for data analysis
17	FSN D 208	Human Values and Professional Ethics-II	2020	
18	FSN D 301	Food Processing and Preservation Technology	2020	<ul style="list-style-type: none"> i. Understand the principles and scope of food processing and preservation. ii. Get an overview on various techniques/methods in food processing and preservation. iii. Acquire knowledge of emerging technologies and their applications in food processing and preservation. iv. Acquaint knowledge on advanced food preservation technologies.
19	FSN D 302	Advances in Human Nutrition	2020	<ul style="list-style-type: none"> i. Appraise the advance concepts of nutrition of Brain, Immunity and Sports. ii. Understand the concepts of dietary management in endemic nutrition problems. iii. Create knowledge on the dietary management during emergencies. iv. Understand the process and relation of immunity and nutrition
20	FSN D 303	Rural work experience	2020	This programme develops competency in the areas of technological, managerial and communication skills among the students. To develop

				communications skills in students using extension training methods through planning, preparing of Teaching Learning materials and providing education in the areas of Nutrition, Child development and transfer of technology.
21	FSN D 304	Internship	2020	INTERNSHIP as dietitian in hospitals give practitioner skills for entry-level dietitians who are able to assume leadership roles to improve and maintain the nutritional care of diverse individuals, families and communities within national and global populations.
22	FSN D 305- A	Nutrition Research techniques	2020	<ol style="list-style-type: none"> I. Understand the methods of nutritional status assessment. II. Knowledge on assessment techniques of protein quality in diets III. Comprehensive knowledge on research techniques using animal models. IV. Gain knowledge in nutrition research techniques using Human models.
23	FSN D 305- B	Geriatric Nutrition	2020	<ol style="list-style-type: none"> I. Understand the physiological changes and theories of ageing. II. Knowledge on importance and consequences of diet in elderly. III. Awareness on degenerative diseases, life style genesis and its management through diet. IV. Describe the government programs and policies for elderly.
24	FSN D 305- C	Nutrition in Emergencies And Disaster Management	2020	<ol style="list-style-type: none"> I. Understand and assess the emergency situations related to food and Nutrition in natural and manmade disasters. II. Acquire knowledge on nutrition surveillance and treatment in emergencies. III. Gain Knowledge on planning nutrition relief and rehabilitation in emergencies. IV. Develop skills in Nutritional epidemiological studies.
25	FSN D306 -A	Fundamentals of Food, Nutrition and	2020	<ol style="list-style-type: none"> I. Gain knowledge on foods, food groups, balanced diet for different age groups. II. Understand the importance of macro and micronutrients in daily diet.

		Health		<ul style="list-style-type: none"> III. Comprehend knowledge on deficiency symptoms of different nutrients. IV. Develop skills and hands on experience to assess nutritional problems in community.
26	FSN D306 -B	Nutritional Assessment	2020	<ul style="list-style-type: none"> I. Learn the determinants of Nutritional Surveillance. II. Understand the direct and indirect methods of nutritional assessment. III. Knowledge on dietary assessment at individual and house hold level. IV. Identify the clinical symptoms and biochemical tests for different nutritional problems.
27	FSN D 401	Food Safety Standards and Quality Control	2020	<ul style="list-style-type: none"> I. Understand the current food safety standards rules and regulations. II. Gain knowledge on desirable and undesirable constituents and contaminants in foods. III. Critical analysis on subjective and objective methods of quality of food. IV. Develop skills for quality analysis and assurance of food.
28	FSN D 402	Food Product Development and Marketing	2020	<ul style="list-style-type: none"> I. Illustrate the new product categories in food market and their characteristics. II. Elucidate the process of new food product development in food industry. III. Exemplify various specialty food products and their applications. IV. Acquire the skill to design and development of new food product and analyze the quality of the product.
29	FSN D 403	Nutrition for Health and Fitness	2020	<ul style="list-style-type: none"> I. Define the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation. II. Understand the Energy metabolism pathways during physical activity. III. Describe the role of macronutrients in physical performance, weight management and obesity. IV. Explains the nutritional needs in different sports and the role of national agencies.

30	FSN D 404	Food Safety Standards and Product Development Practical's	2020	<ol style="list-style-type: none"> i. Develop skills for quality analysis and assurance of food. ii. Acquire the skill to design and development of new food product and analyze the quality of the product.
31	FSN D 405 A	Institutional Food Service Management	2020	<ol style="list-style-type: none"> I. Understand the different types and management of food services. II. Illustrate the infra structure plans, menus and equipment in food service establishments. III. Know the food safety measures in food service establishments. IV. Knowledge on finance and personnel management.
32	FSN D 405 C	Technology of Packaging(T+P)	2020	<ol style="list-style-type: none"> i. Provide knowledge on packaging and packaging materials ii. An overview of the scientific and technical aspects of food packaging. iii. Enable the students to understand the regulations of packaging and packaging material testing. iv. Apply skills of new innovations in food packaging to improve product stability and/or to extend the product shelf-life.
33	FSN D 406- A	Child Growth and Development	2020	<ol style="list-style-type: none"> i. Know the terms growth, development and stages of development across life span ii. Understand the characteristics of children at different stages of childhood iii. Explain the different developments like physical, cognitive , language and social development during childhood. iv. Apply knowledge to understand normal development and developmental delays during childhood.
34	FSN D 406- B	Disaster Management	2020	<ol style="list-style-type: none"> i. Know about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management. ii. To understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters

				iii. Explain the efforts made by the NGOs, Community based organizations and local administration in disaster management. iv. Discriminate disaster responses of Armed forces and Police.
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Human Development and Child Welfare

Extension Management and Communication Technology

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	EMCT-101	Extension Education in Community Development	2020	The students can gain understanding on the Extension Management community development and panchayat raj system to study the community by using PRA and various approaches of extension education. The students will get jobs as extension officers, and various placements in community development projects, as well as rural co-operative sector.
2	EMCT-	Community	2020	The students know about nutrients in food and know about the

	102	Nutrition		nutritional deficiencies and the community level problems and policies and programmes of Nutrition.
3	EMCT-103	Communication and Media Preparation	2020	The concept of Communication –Recent trends in Instructional technology: Extension literature and the role of different factors influencing and effecting communication process- Dyad setting small group and mass communication. This course will help the students to improve their communication skills.
4	EMCT-104	Extension Education in Community Development Practical	2020	The students will acquire skill to study the community by using PRA techniques and develop the skill of critical analysis on various approaches of extension education.
5	EMCT-105	Community Nutrition Practical	2020	Students gain practical knowledge on the role of nutrients in different stages of human life and methods of nutritional assessment and community level problems and policies.

6.	EMCT-106	Communication and Media Preparation Practical	2020	Students analyze the role of different factors influencing and effecting communication process, preparation and use of different teaching aids in teaching different groups of people and in different learning situations.
7.	EMCT-107	Dynamics of Rural Society	2020	The students will gain knowledge on social structure; characteristics of rural people; rural social problems - social institutions, learn the factors affecting social change and gain insight about the welfare policies and programmes for rural society.
8.	EMCT-108	Human Values and Professional Ethics-1	2020	. Students will apply knowledge of professional ethics and correlate the concepts in addressing the ethical issues outside the class room.
9.	EMCT-201	Entrepreneurial Development and Empowerment of Women	2020	Students acquire knowledge on Entrepreneurship, about the strategies for empowering women; rights of women and develop the entrepreneurship skills and learn about the institutional support of entrepreneurship. This course will help the students to become good entrepreneurs and also to start their own business enterprise.
10.	EMCT-	Educational	2020	The students gain knowledge on concept of teaching learning process;

	202	Technology		forms and levels of teaching and learning; curriculum design, development knowledge on genesis and trends in modern education. This will help the students to develop the curriculum and to choose their career in the teaching field.
11	EMCT-203	Community organization and Leadership	2020	Students will know about community organization, process of Community organization, rural institutions, leadership, analyze different patterns of leadership; techniques of identification of leaders; steps to organize youth clubs; Role of Panchayat in developing rural women.
12	EMCT-204	Entrepreneurial Development and Empowerment of Women Practical	2020	Students will realize the role of entrepreneurship in economic development. Develop the skill of writing the business proposal and starting of business enterprise.
13	EMCT-205	Educational Technology Practical	2020	Students will develop the skill on developing a course curriculum; Preparation of lesson plans of selected topics and use of different instructional materials.
14	EMCT-206	Community Organization and Leadership	2020	Students will develop the skill on different patterns of leadership, techniques of identification of leaders, and appraise the ongoing

		Practical		programmes in the locality.
15	EMCT-207	Research Methodology	2020	Students get knowledge on ‘variables’, ‘hypothesis’, research ‘and recognize the purpose of doing a research, sampling methods and develop a research proposal in the appropriate scientific style.
16	EMCT-208	Human values and Professional Ethics-II	2020	Students gain knowledge on ‘value education’ ‘self-introspection’ and ‘self-esteem develop well balanced personality, socially responsible persons of the society.
17	EMCT-301	Rural Development Administration	2020	Students gain insight about administration in Extension and rural development: coordination and supervision in rural development administration, the purpose and principles of administration; human relation in extension administration the recent ongoing rural development programmes etc. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
18	EMCT-302	Training and Development	2020	Students will learn the concept of training, goals of training; learning and types of learning, factors affecting learning among adult, current trends in training methodologies; training strategies and designs and acquire skills in developing; selection and use of different training methods- case study; role play; and brain storming; etc. This course

				will help the students to get jobs as Trainee- motivators, Trainers, consultants etc.
19	EMCT-303	Rural Work Experience	2020	Students will develop an understanding of rural life situations prevailing in villages with special reference to Home science among the student will know about socioeconomic conditions of people and their problems and several agencies and institutions involved in rural development.
20	EMCT-304	Internship	2020	Students will gain first-hand exposure of working with NGOs. This will provide a practice-oriented and 'Hands-on' working experience in the NGOs / Government organizations and to enhance the students learning experience.
21	EMCT-305	(a) Managerial Skills for Extension Professionals (b) Communication Technologies in Extension (c) Sustainable Livelihood Systems	2020	a) Students will know about the conceptualization of management process and its major functions, managerial skill; nature and importance for extension professionals. To understand the concept; scope and relevance of media in society; functions and future prospects of media systems b) To understand the concept; scope and Communication technologies, relevance of media in society; functions and future prospects of media systems etc c) Students will know about the livelihoods of rural/urban people; resources – land, soil; climate; water and forests; processes and

	402	Programme Planning and Evaluation		Programme Implementation; Programme Evaluation, Documentation, Programme Planning; the Preparation of plan of work ; Purpose, types and tools of Evaluation; Programme planning and implementation, documentation in Programme implementation. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
25	EMCT-403	Thesis/Community Health Management	2020	Students gain knowledge about the concept of community health and global health; Primary Health Care – definitions; principles; components; comprehensive health care; levels of prevention, major health problems in India, management information systems in health, health needs of special groups – women, infants; and children; health of adolescents; geriatric health needs and problems.
26	EMCT-404	Principles of Guidance and Programme Planning Practical	2020	Assess the guidance programmes and counseling process in school and out of school settings and analyze use of standard test of study habits and attitudes (SSHA) for analyzing the study habits and attitudes.
27	EMCT-405	(a)Extension Management (b) Science & Technology for	2020	a) Students will know about administration and management; process of management and organizational climate, understand the qualities and functions of extension personnel; Problems and issues of extension management in India. b) Analyze the management skills of extension personnel. Students will learn about the Science and Technology for rural

				administration in disaster management.
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Food Technology

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	FT-101	Food Chemistry and Analysis	2017	<ul style="list-style-type: none"> - Students will acquire knowledge about physical, chemical, and functional properties of foods. - Learn the fundamental principles and working applications of different analytical techniques associated with food. - Students will be able to explore and perform skills in qualitative and quantitative estimation of nutrients in different foods.
2	FT-102	Food Science and Experimental Foods	2017	<ul style="list-style-type: none"> - Students will acquire knowledge on structure, composition and functional properties of plant and Animal foods. - Understand the principles of cookery of different foods and methods of evaluation. - Students will be able to apply the

				scientific method and quantitative techniques in standardisation of foods using different processing techniques.
3	FT-103	Cereal Grains, Legumes and Oilseed Technology	2017	<ul style="list-style-type: none"> - Students will gain knowledge on the structure and composition of cereal grains, pulses and oil seeds. - Understanding of the basic concepts of Post harvest technology, mechanism of equipments and processing of cereals, pulses and oilseeds - Know about various processing, milling process and evaluate Traditional and commercially processed foods with cereals, pulses and oilseeds
4	FT-104	Food Chemistry and Analysis	2017	<ul style="list-style-type: none"> - The students will know about principles and working applications of different analytical techniques associated with food. - Perform skills in qualitative and quantitative estimation of nutrients in different foods.
5	FT-105	Food Science and Experimental Foods	2017	<ul style="list-style-type: none"> - Comprehensive knowledge on techniques of analysing, evaluating and application of foods in different processing techniques in foods.
6.	FT-106	Cereal Grains, Legumes and	2017	<ul style="list-style-type: none"> - The students will be able to explore

		Oilseed Technology		<p>knowledge on various processing techniques of cereals, legumes and oilseeds.</p> <ul style="list-style-type: none"> - Students acquire knowledge in various food applications and product preparations.
7.	FT-107	Essentials of Food and Community Nutrition	2017	<ul style="list-style-type: none"> - Students gain knowledge about nutrients in food and their functions. - Understand the nutritional problems of the community and consequences of deficiency of taking nutrients. - Apply skills for planning diets and techniques to assess the nutritional status of different age groups
8.	FT-108	Human Values and Professional Ethics - I	2019	<ul style="list-style-type: none"> - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. - Values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. - Introducing different concepts of Bhagavad Gita and its applications in uplifting of values in the present

				society.
9.	FT-201	Technology of Horticulture produce	2017	<ul style="list-style-type: none"> - Attain an overview on the classification composition and post-harvest handling technologies of fruits and vegetables to reduce postharvest losses and their value addition. - Impart the knowledge of processing, preservation and manufacture of fruits and vegetable based food products of fruits and vegetables. - Expertise in development of various Fruits & vegetables based products and assess the quality of fruit and vegetables and their products.
10.	FT-202	Food Microbiology and Safety	2017	<ul style="list-style-type: none"> - Obtain knowledge about important genera of microorganisms associated with food and food spoilages. - Understand the various factors associated with growth, food spoilage and food-borne diseases of different microorganisms. - Demonstrate the use of standard methods and procedures for the microbiological analysis of food
11	FT-203	Dairy Technology	2017	<ul style="list-style-type: none"> - Impart the knowledge of milk grading , composition and

				<p>technologies of processing of milk and milk products.</p> <ul style="list-style-type: none"> - Provide in-depth knowledge in various unit operations and developments in dairy processing. - Demonstrate the manufacturing of various dairy products and exemplify the quality of dairy products.
12	FT-204	Technology of Horticulture produce	2017	<ul style="list-style-type: none"> - Student will know about various fruit and vegetable processing techniques and attain practical knowledge in production and preparation of products
13	FT-205	Food Microbiology and Safety	2017	<ul style="list-style-type: none"> - Acquire knowledge on laboratory techniques to identify microorganisms in food. - Demonstrate the various microbial estimations in foods by applying standard techniques.
14	FT-206	Dairy Technology	2017	<ul style="list-style-type: none"> - Students acquire knowledge of grading, composition, quality evaluation and processing techniques of milk and milk products.
15	FT-207	Research Methodology	2017	<ul style="list-style-type: none"> - Awareness about terms like ‘variables’, ‘hypothesis’, research ‘and recognize the purpose of doing research.

				<ul style="list-style-type: none"> - Understand different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research. - Critically apply knowledge to select a sample by using different sampling methods like probability and non-probability sampling and development of research proposal.
16	FT-208	Human Values and Professional Ethics – II	2017	<ul style="list-style-type: none"> - Student will know the values of ethics in various fields including medical, social and business ethics. - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. - Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
17	FT-301	Food processing and Preservation Technology	2017	<ul style="list-style-type: none"> - Students able to understand the scope, principles and different methods of processing and preservation techniques. - Acquire knowledge of emerging technologies and their applications

				<p>in food processing and preservation.</p> <ul style="list-style-type: none"> - Understand the applications and limitations of food processing and preservation technology.
18	FT-302	Live Stock and Sea Food technology	2017	<ul style="list-style-type: none"> - Acquire knowledge of the structure, composition, nutritional quality of various, livestock and seafood. - Gain insight knowledge of slaughtering, carcass processing, processing methods used for processing meat poultry and fish. - Prepare various value-added products of egg, meat, poultry and sea foods.
19	FT-303	Food Processing and Preservation Technology	2017	<ul style="list-style-type: none"> - Student acquires knowledge of emerging technologies and their applications in various processing techniques and products of various foods by processing and preservation methods.
20	FT-304	In plant training.	2017	<ul style="list-style-type: none"> - Provide hands on experience with regard to different areas in food industries. - Acquaint and gain knowledge related to production, unit operations, quality control and marketing aspects of food industry. - Emphasize the prominence of food plant sanitation, food safety,

				standards, laws and regulation in food industry.
21	FT-305(a)	(a) Unit operations in Food Industry.	2017	<ul style="list-style-type: none"> - Important preliminary operations in food processing industries and understand the principle of Unit operation in food industry. - Impart knowledge on Safety, sanitation and Effluent Treatment in food industry. - Know the different pre and post processing operations as storage and packaging foods etc.
22	FT-305(a)	(b) Spices, Condiments and Plantation Crops	2017	<ul style="list-style-type: none"> - Students acquire knowledge, identification and post-harvest technologies of various spices, condiments and plantation crops. - Illustrate various value added products of spices, condiments and plantation crops. - Perceive Standards, specifications, packaging and Quality control measures of spices, condiments and plantation crops.
23	FT-305(a)	(c) Nutrition in Emergencies and Disaster	2017	<ul style="list-style-type: none"> - Explain concepts on Epidemiology and its application in planning programs during emergencies and emergency situations in natural and manmade disasters.

				<ul style="list-style-type: none"> - Gain knowledge on nutrition surveillance and treatment in emergencies. - Knowledge on planning nutrition relief and rehabilitation in emergencies.
24	FT-306(a)	(a)Fundamentals of Food, Nutrition and Health	2017	<ul style="list-style-type: none"> - Gain knowledge on foods, food groups, balanced diet and importance of macro and micronutrients for different age groups in daily diet. - Comprehend knowledge on deficiency symptoms of different nutrients. - Apply skills to assess on nutritional problems in community.
25	FT-306(b)	b)Nutritional Assessment	2017	<ul style="list-style-type: none"> - Understand the nutritional problems of the community and consequences of deficiency of taking nutrients. - Apply skills for planning diets and techniques to assess the nutritional status of different age groups.
26	FT-401	Food Safety Standards and Quality Control	2017	<ul style="list-style-type: none"> - Gain knowledge in current rules and regulations of food safety standards and quality assurance. - Understand the insight quality evaluation of different foods by

				<p>standard methods.</p> <ul style="list-style-type: none"> - Develop skills for quality analysis and assurance of food quality.
27	FT-402	Food Product Development and Marketing	2017	<ul style="list-style-type: none"> - Elucidate the process of new food product development process to generate ideas, develop concept to test market and in food industry. - Acquire the skill to design and development of new food product and analyse the quality of the product. - Student able to design, demonstrate the skills in food process, organoleptic evaluation and nutritional label of food products as a team work.
28	FT-403	Nutrition for Health and Fitness/Project Work	2017	<ul style="list-style-type: none"> - Understand the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation. - Describe the role of nutrients in physical performance, weight management, obesity and Energy metabolism pathways during physical activity. - Gain knowledge on concepts of physical activity, physical fitness and the importance of nutrients in Sports.

29	FT-404P	Food Safety standards and Product Development	2017	<ul style="list-style-type: none"> - Gain knowledge on subjective and objective evaluation methods of foods with safety and standards. - Exemplify various speciality food products and their applications, acquire the skill to design and development of new food product and analyse the quality of the product.
30	FT-405 (a)	(a) Institutional food service management	2017	<ul style="list-style-type: none"> - Gain knowledge on principles of safe food preparation and cooking methods and service management.
31	FT-405 (b)	(b)Basic Food Engineering	2017	<ul style="list-style-type: none"> - Student understands the basic Principles, overview of processing techniques and methods of food. - Able to describe the types and properties of agro processing equipments like pasteurizer, spray drier and sealing equipments. - Enumerate processing equipments and maintenance of processing equipments
32	FT-405 (c)	(c)Food Packaging	2017	<ul style="list-style-type: none"> - Enable the students to understand the regulations of packaging and packaging material testing. - Knowledge of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life.

				<ul style="list-style-type: none"> - Able to utilize some of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life.
33	FT-406(a)	(a) Child Welfare Programmes	2017	<ul style="list-style-type: none"> - Understand the different developments like physical, cognitive, language and social development during childhood. - Apply knowledge to understand normal development and developmental delays during childhood.
34	FT-406(b)	(b) Disaster Management	2017	<ul style="list-style-type: none"> - Understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters;. - Illustrate the efforts made by the NGOs, Community based organizations and local administration in disaster management.

38. Mathematics

39. Microbiology

40. Physics

41. Psychology

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	PSY 101	General Psychology-I	2020	<ul style="list-style-type: none"> • To understand the concepts and scope of psychology • To comprehend the biological basis of behavior • To study the perception and learning theories
2	PSY 102	Social Psychology	2020	<ul style="list-style-type: none"> • To understand the concepts of social psychology • To comprehend the social perception and cognition. • To study the socialization and attitudes
3	PSY 103	Psychopathology-I	2020	<ul style="list-style-type: none"> • To understand the abnormal behavior and historical and current trends • To comprehend the models of abnormal behaviour and approaches to therapies
4.	PSY 104	Psychological Measurements-I	2020	<ul style="list-style-type: none"> • To understand the psychological measurements • To comprehend the development of psychological tests and principles of test construction.
5	PSY 105P	Practical-I&II	2020	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
6.	PSY-106	Human Values and	2020	

		Professional Ethics-I		
7.	PSY 201	General Psychology-II	2020	<ul style="list-style-type: none"> • To understand fundamentals of motivation and emotion • To understand basic concepts of memory and forgetting • To comprehend the thinking, intelligence and personality of individuals
8.	PSY 202	Applied Social Psychology	2020	<ul style="list-style-type: none"> • To understand the Social Influence, Social Exchange Process in social behaviour. • To comprehend the Prejudice and Discrimination and group and individuals.
9.	PSY 203	Psychopathology-II	2020	<ul style="list-style-type: none"> • To understand anxiety and mood disorders and somatic disorders. • To study Psychosis and Cognitive Disorders across life span
10.	PSY 204a	Psychological Measurements & Statistics	2020	<ul style="list-style-type: none"> • To understand the psychological measurements • To comprehend the development of psychological tests and principles of test construction.
	PSY 204b	Research Methodology	2020	<ul style="list-style-type: none"> • To get knowledge of psychological tests and their use in diagnosis. • To make students able to diagnose patients with the help of projective tests. • To get understanding of different diagnostic systems. • Learn how to take case history of patients. • To be able to make differential diagnosis.

	PSY 204c	Computer Applications in Psychological Research	2020	<ul style="list-style-type: none"> • To understand the basic components of computer and working in Ms Office, power point and internet services. • To comprehend the application of computer knowledge through creating emails, scientific journals and data scoring
11	PSY 205P	Practical - I & II	2020	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
12	PSY 206	Human values and Professional Ethics-II	2020	
13	PSY 301	Lifespan Developmental Psychology - Infancy to Adolescence	2020	<ul style="list-style-type: none"> • To understand the scope of life span development of infancy and babyhood • To comprehend the Early and Late Childhood and Adolescence.
14.	PSY 302	Personality	2020	<ul style="list-style-type: none"> • To introduce nature of personality. • To help determinants and development. To understand the Assessment of personality
15	PSY 303	Counseling Psychology-I	2020	<ul style="list-style-type: none"> • To understand the meaning of counseling and ethics in counseling • To comprehend the process of counseling and techniques
16	PSY 304a	School Psychology	2020	<ul style="list-style-type: none"> • To introduce nature of school psychology • To help children with emotional, social, and academic issues. • To collaborate with parents, teachers, and students to promote a healthy learning

				environment.
	PSY 304b	Organizational Behaviour and HRM	2020	<ul style="list-style-type: none"> • To understand organization and the Individual differences • To comprehend the motivation and leadership <p>To study the decision making and organizational effectiveness.</p>
	PSY 304c	Health Psychology	2020	<ul style="list-style-type: none"> • To understand the need of Health psychology and various models related to health and illness. <p>To comprehend the health behaviour enhancement and management</p>
	PSY 304d	Psychology of Disability	2020	<ul style="list-style-type: none"> • To understand historical development – Models of disabilities in the past and present scenario <p>To comprehend Learning and behavioral disability, Needs and concerns of disabled in all groups</p>
17	PSY 305P	Practical - I & II	2020	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
18	PSY 306	Personality Development (OE)	2020	<ul style="list-style-type: none"> • To study the biological, psychological and socio cultural determinants & Soft Skills • To help determinants and development. • To understand the Assessment of personality
19	PSY 401	Lifespan Developmental Psychology – Adulthood and Later Maturity	2020	<ul style="list-style-type: none"> • To understand the scope of life span development of Adulthood and Later Maturity.

				<ul style="list-style-type: none"> • To comprehend the Adulthood and Later Maturity.
20	PSY 402	Theories of Personality	2020	<ul style="list-style-type: none"> • To introduce nature of personality. • To help determinants and development. • To understand the Assessment of personality
21	PSY 403	Counseling Psychology - II	2020	<ul style="list-style-type: none"> • To understand the meaning of counseling and ethics in counseling • To comprehend the process of counseling and techniques
22	PSY 404a	Psychology of Aging – Applied Aspects	2020	<ul style="list-style-type: none"> • To study and understand the aging from maturity to old age. • A form of discrimination against older adults based on their age. • To notice gerontology and issues
	PSY 404b	Consumer Behaviour and Marketing	2020	<ul style="list-style-type: none"> • To understand concept of consumer behaviour and market research • To comprehend the economic, social and psychological theory of buying motives. • To study the effect of advertising, sales promotion, branding and packaging
	PSY 404c	Rehabilitation Psychology	2020	<ul style="list-style-type: none"> • To understand historical development – Models of disabilities in the past and present scenario • To comprehend Learning and behavioral disability, Needs and concerns of disabled in all groups
23	PSY 405P	Practical I & II	2020	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment

				<ul style="list-style-type: none"> • To analyze the observed and the collected data to prove the theoretical
24	PSY 406	Life Skills (OE)	2020	<ul style="list-style-type: none"> • To learn the concept of life skills and its importance in relation to personality development of an individual. • To become aware of the components of life skills and the method of imparting knowledge of life skills.

Mathematics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1. 1	MA 101	Algebra	2020	<ol style="list-style-type: none"> 1. Identify the concept of action and conjugation. 2. Explain the applications of Sylow's theorems 3. Understand homomorphism and ideals in Rings. 4. Understand U.F.D, E.D and Polynomial Rings
2.	MA 102	Real analysis	2020	<ol style="list-style-type: none"> 1. Understand the concepts of Riemann Stieltjes integration and Differentiation. 2. Understand Uniform Convergence and continuity. 3. Learn comparison tests at a and infinity. 4. Analyze the concept of functions of several variables.
3.	MA 103A	Ordinary Differential equations	2020	<ol style="list-style-type: none"> 1. Learn boundary value problems, Eigen values and Eigen functions

				<p>2. Solve the second order linear questions.</p> <p>3. Apply knowledge on special functions of Mathematical Physics.</p> <p>4. Understand the method of successive approximation and solve the problems related to Picard's theorem</p>
4.	MA 103 B	Linear Algebra	2020	<p>Solve the system of linear equations</p> <p>Understand the concept of vector space, basis and dimension. Analyze the linear Transformation</p> <p>3. Explain the direct sum decompositions</p> <p>4. Understand the Bilinear forms.</p>
5.	MA 104A	Numerical Methods	2020	<p>Solve Algebraic and Transcendental polynomial equations.</p> <p>2. Understand Interpolation, Differentiation, Integration, the solution of Differential Equations</p> <p>3. Solving the direct methods, matrix inversion methods and iterative method...etc.</p> <p>4. Analyze and evaluate the accuracy of common Numerical methods.</p>

6.	MA 104B	Lattice theory	2020	<p>Know Partly Ordered Sets.</p> <p>2. Understand Lattices as Algebraic structures</p> <p>3. study complete Lattices.</p> <p>4. Compare the distributive and modular lattices</p>
7.	MA 105	Complex Analysis	2020	<ol style="list-style-type: none"> 1. Decide when and where a given function is analytic and be able to find its series development 2. Describe conformal mappings between various plane regions 3. Describe basic properties of complex integration and having the ability to compute such integrals. 4. Understand Power series and expansion of analytic function.
8.	MA 106	Discrete Mathematics	2020	<ol style="list-style-type: none"> 1. Use standard Normal Forms- Disjunctive-Conjunctive Principal Disjunctive 2. Understand Inference Theory of the Predicate Calculus 3. Understand Lattices and Boolean Functions. 4. Understand basic concepts of graph theory.

9.	MA 201	Galois Theory	2020	<ol style="list-style-type: none"> 1. Apply the knowledge on polynomials solvable by radicals, Extension field. 2. Understand the Explain the normal and separable extensions and concepts such as extension fields and splitting fields 3. Study the roots of polynomials speciallyquintic polynomials which is the cause to develop Galois theory. 4. Solve the problems on cyclotomic polynomials.
10.	MA 202	Partial Differential Equations	2020	<p>Analyze the origin of first order PDEs and Integral surfaces passing through a given curve</p> <ol style="list-style-type: none"> 2. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method. 3. Solve the various, methods on Partial Differential Equations of the Second order. 4. Obtain equipotential surfaces using Laplace's equation.

11.	MA 203A	Topology	2020	<ol style="list-style-type: none"> 1. Understand to construct topological spaces from metric spaces and using general properties of neighborhoods, open sets, closed sets, basic and sub-basis. 2. Understand Topological Spaces, definition & examples. 3. They know what we mean by connectedness, compactness, and hausdorf property and their general characteristics. 4. Understand the Countability axioms, the separation axioms and normal spaces. And also the classical theorems such as the Uryshon lemma, the Tietze extension theorem.
12.	MA 203B	Semi group Theory	2020	<ol style="list-style-type: none"> 1. Discuss semi groups with the properties. 2. Explain The structure of D.Classes – regular semigrups. 3. Obtain proofs of Rees’s Theorem and Primitive idempotents. 4. Know the congruences on completely O-Simple semi groups
13.	MA 204A	Advanced Complex Analysis	2020	<ol style="list-style-type: none"> 1. To learn Laurent Series-Singular Points.

				<p>2. Explain the basic properties of complex integration and compute such integrals.</p> <p>3. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions.</p> <p>4. Understand the Infinite product and Partial Fraction Expansions.</p>
14.	MA 204B	Nonlinear Analysis	2020	<p>1) Explain fixed point theory and its applications by well known theorems.</p> <p>2) Analyse the approximations in Normed spaces, strict convexity – uniform, Chebyshev polyamines, Hilbert space , splines.</p> <p>3) Use of complex analysis in spectral theory, Banach algebras</p> <p>4) Evaluation of spectral theory in normed spaces, finite dimensional normed spaces.</p>
15.	MA 205	Measure and Integration	2020	<p>Compute Lebesgue measures.</p> <p>2. Compute Lebesgue integrals of bounded functions over a set of finite measure</p>

				<p>3. Solving the Differentiation and Integration of Monotone functions.</p> <p>4. Understand the L^p Spaces, The MinKowski and Holder inequalities, Convergence and completeness</p>
16.	MA 206	Mathematical Statistics	2020	<p>To learn the fundamental concepts of statistics and techniques required for data analysis.</p> <p>2. Apply the knowledge of Binomial, Poisson, Gamma, chi-square, normal distribution in solving various problems,.</p> <p>2. To explain stochastic convergence</p> <p>3. To discuss measures of quality of estimations</p>
17.	MA 301	Commutative Algebra	2020	<p>To understand the ideals, Modules and operations on them.</p> <p>2.To learn the structures of composition</p>

				<p>series with ACC and DCC</p> <p>2. To study the theoretical properties of Noetherian rings</p> <p>3. Explain decomposition theorem and applications.</p> <p>5. To develop applications in the different fields.</p>
18.	MA 302	Functional Analysis	2020	<ol style="list-style-type: none"> 1) They can work with different distance metrics and normed spaces. 2) Understand continuous linear transformations and the Hahn-Banach Theorem. 3) Comprehend the Open mapping theorem and Closed graph theorem. 4) Construct orthonormal sets and conjugate spaces. 5) Understand the relevance of self-adjoint operators, normal, unitary operators and projections. <p>Comprehend the ideas of determinants and the spectrum of an operator</p>

19.	MA 303 A	Differential Geometry	2020	<p>define space curves , curvature and torsion of a curve.</p> <p>2. Parameterize surfaces and use the metric tensor. Calculate isometries.</p> <p>3. treat geodesic curves and parallel translation .</p> <p>4. calculate and analyse curvature of surfaces in different settings.</p> <p>s5. know the concept of tensor and recognize tensors that are used in mechanics ,</p> <p>Image processing and theory of relativity.</p>
20.	MA 303 B	Algebraic coding theory	2020	<p>Analyse Error detecting and error correcting codes.</p> <p>2. Understand and apply algorithms in applications like sending messages without errors.</p> <p>3. Use bounds for different types of codes.</p> <p>4. Understand the polynomial encoding and decoding.</p>
21.	MA 304	Classical Mechanics	2020	<p>1) Understand D' Alembert's</p>

				<p>Principle and simple applications of the Lagrangian Formulation.</p> <ol style="list-style-type: none"> 2) Derive the Lagrange's Equation from Hamilton's Principle. 3) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems. 4) Distinguish the concept of the Hamilton Equations of Motion and the Principle of Least Action. 5) Get familiar with canonical transformations, conditions of cononicity of a transformation in terms of Lagrange and Poisson brackets.
22.	MA 305	MAT-LAB	2020	<p>.Understand the mathematical operations & functions.</p> <ol style="list-style-type: none"> 2. Write a program to addition & multiplication matrices. 3. Understand the 2-D plotting and 3-D plotting techniques. 4. Solve algebraic and transcendental equations.
23.	MA 306A	Business Mathematics	2020	<ol style="list-style-type: none"> 1. Apply the knowledge in

				<p>mathematics (algebra, matrices, calculus) in solving business problems.</p> <ol style="list-style-type: none"> 2. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and business. 3. Explain the concepts and use equations, formulae and mathematical expressions and relationships in a variety of contexts 4. Understand The Binary Octal , Octal, Decimal and Hexadecimal Systems.
24.	MA 306B	Fundamentals of Mathematical Statistics	2020	<ol style="list-style-type: none"> . To learn the fundamental concepts of statistics and correlation analysis 2. To analyse regression lines. 3. To explain tests of significance 4. To solve liner equations by matrix methods

25.	MA 401	Number Theory	2020	<ol style="list-style-type: none"> 1. Understand arithmetical Functions. 2. Use functions $\Phi(n)$, $\Pi(n)$, $\Pi(n)$. 3. Understand the definitions of congruences, residue classes and least residues 4. Apply legendary polynomial and application of reciprocity law.
26.	MA 402	Banach Algebra	2020	<ol style="list-style-type: none"> 1. Understand different types of Banach Algebras with examples. 2. Know the essence of Gelfand mapping 3. Understand the Application of Commutative C^*- algebras. 4. Derive the applications of Banach Algebra in analysis, Fourier series, Boolean Algebras and other significant areas of mathematics.
27.	MA 403A	Graph Theory	2020	<ol style="list-style-type: none"> 1. Able to define basic concepts of graphs 2. Utilize the Algorithms to find the shortest path, Optimal tree from a given graph. 3. construct reliable communication network. 4. Understand the concepts of practical problems like Chinese postman problem

				and travelling salesman problem
28.	MA 403B	Approximation Theory	2020	<ol style="list-style-type: none"> 1) Know the Basic concepts of Metric spaces And Normed Linear space. 2) Knows existence and uniqueness theorems for the best approximations in various Banach spaces. 3) Knows Bernstein's lethargy theorem and its practical and theoretical implications. 4) Be able to use and analyze the basic methods for polynomial approximations.
29.	MA 404	Operations Research for Industry and Community Development	2020	<ol style="list-style-type: none"> 1) Formulate some real life problems into Linear Programming Problems. 2) Understand Dynamic Programming. 3) Solve the problems of Game with pure Strategies and Mixed Strategies. 4) Construct Reliable Networks.
30.	MA 405	Computer Oriented Numerical Methods	2020	<ol style="list-style-type: none"> 1. Gain Knowledge in C-Language 2. Able to use commands and operations of C.

				<p>3. Solve integration and ODE problems by numerical methods</p> <p>4. Write the programming to solve problems in numerical methods.</p>
31.	MA 406A	Business Mathematics-II	2020	<ul style="list-style-type: none"> • Able to solve problems on Time and work, Distance • Understand the mixtures and also learn to calculate the Simple interest and compound interest. • Find roots of Algebraic equations and sum and terms of given series. • Analyse the data from charts and graphs..
32.	MA 406B	Mathematics for Social Sciences	2020	<ol style="list-style-type: none"> 1. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 2. Understand the concepts of Limit, continuity & differentiation of functions. 3. Apply Integrals to find areas, length & volume of regions. 4. Apply the numerical Techniques to solve differential equations & Algebraic equations.

Applied Mathematics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	AMA 101	Methods of Applied Mathematics	2020	<p>Expand a function in a Fourier series and able to know under what conditions such an expansion is valid.</p> <p>2. Aware of the connection between integral transforms (Fourier and Laplace) and be able to use the latter to solve mathematical problems relevant to the physical sciences.</p> <p>3. Understand the applications of Sylow theorems.</p> <p>4. Describe Unique Factorization and Euclidean Domains</p>
2.	AMA 102	Real Analysis	2020	<p>Understand the concepts of Riemann Integration and Differentiation.</p> <p>2. To learn the different types of Sequences and Series of Functions, Equicontinuous Families of Functions.</p> <p>3. Understand Uniform</p>

				Convergence and continuity. 4. Apply the Stone-Weierstrass theorem.
3.	AMA 103A	Ordinary Differential Equations	2020	<ol style="list-style-type: none"> 1. Recognize and classify O.D.Es. 2. Learn boundary value problems, Eigen values and Eigen functions 3. Apply knowledge on special functions of Mathematical Physics. 4. Understand the method of successive approximation and solve the second order linear questions. 5. Solve the problems related to Picard's theorem 6. Identify research problems where D.Es can be used . 7. Analyse engineering problems like series/ parallel circuits etc using 1st and 2nd order O.D.Es.
4.	AMA 103B	Viscous Flows	2020	<p>Employ Bernoulli's equation for real flow and deduce expressions for orifice meter and Venturimeter.</p> <ol style="list-style-type: none"> 2. Establish Hagen Poiseuille's equation for

				<p>laminar flow through pipe and parallel plates.</p> <p>3. The course provides the student with knowledge about: - Formulating and solving problems in fluid mechanics where viscosity and heat conductivity are of importance, in particular at high Reynolds numbers where the boundary layer approximation applies. - Primary focus is on the laminar flow regime. Briefly about stability and transition to turbulence. - Quantitative methods for classical cases, such as Stokes problems, stagnation point flow, Blasius and Falkner-Skan problems, and integral methods for other boundary layers with pressure gradient and possible separation</p>
5.	AMA 104A	Numerical Methods	2020	<p>solve Algebraic and Transcendental polynomial equations.</p> <p>2.Learn how to apply the Numerical method for various Mathematical operations and tasks.</p> <p>3.Understand Interpolation,Differentiation,Integration,the solution of Differential Equations</p> <p>4.Analyse and evaluate the accuracy of common Numerical methods.</p>

6.	AMA 104 B	Boundary Value Problems	2020	<p>. Use the knowledge of Legendre and Chebyshev polynomials.</p> <ol style="list-style-type: none"> 2. Apply Fourier and Hankel transforms in engineering problems. 3. Solve boundary value problems. 4. Understand the probability theory.
7.	AMA 105	Complex Analysis	2020	<ol style="list-style-type: none"> 1. Identify curves and regions in the complex plane defined by simple expressions. 2. Describe basic properties of complex integration and having the ability to compute such integrals. 3. Decide when and where a given function is analytic and be able to find it series development. 4. Describe conformal mappings between various plane regions. 5. Apply the concepts of Complex Analysis in many branches of mathematics, including algebraic geometry, number theory, analytic combinatorics, applied mathematics; as well as in physics, including the branches of hydrodynamics, thermodynamics and particularly quantum mechanics.

8.	AMA 106	Discrete Mathematics	2020	<ol style="list-style-type: none"> 1. Use standard notations of propositional logic. 2. Understand the truth tables for expressions involving negation, conjunction, and disjunction 3. Determine if a logical argument is valid or invalid. <p>Find concepts and notations from discrete mathematics are useful in studying Automata theory ,Number theory and mathematical cryptography</p>
9.	AMA 201	Mathematical Modeling	2020	<ol style="list-style-type: none"> 1) Understand what a mathematical model is and explain the series of steps involved in a mathematical modeling process. 2) Identify some simple real-life problems that can be solved using mathematical models, model the problem, solve the resulting problem, and interpret the solution. 3) Acquire basic mathematical modeling skills that will enable them carry out simple modeling tasks individually or as a group. 4) State and explain the different classifications of mathematical models stating examples in each class. 5) Analyze the importance of partial differential equations in mathematical

				<p>modeling.</p> <p>6) Frame quantitative problems and model them mathematically.</p>
10.	AMA 202	Partial Equations	Differential 2020	<ol style="list-style-type: none"> 1. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method. 2. Apply Variables separable methods to solve Laplace Equation in cylindrical or spherical coordinates. 3. Obtain equipotential surfaces using Laplace's equation. 4. Understand the importance of

				partial differential equations in geometry, physics and other subjects.
11.	AMA 203A	Topology	2020	<ol style="list-style-type: none"> 1. Understand to construct topological spaces from metric spaces and using general properties of neighbourhoods, open sets, closed sets, basic and sub-basis. 2. Apply the properties of open sets, closed sets, interior points, accumulation points and derived sets in deriving the proofs of various theorems. 3. To understand the concepts of countable spaces and separable spaces. 4. They know what we mean by connectedness, compactness, and hausdorff property and their general characteristics. 5. Understand the Countability axioms, the separation axioms and normal spaces. <p>Understand the classical theorems such as the Uryshon lemma, the Tietze extension theorem</p>
12.	AMA 203B	Magneto Hydro Dynamics	2020	Understanding the basic concepts and the equations of flow of viscous fluids.

				<p>Understanding the electromagnetic induction mechanism which has its origin in the movement of fluids that are good electrical conductors</p> <p>2. Ability to translate a magnetic hydrodynamic problem in an appropriate mathematical form.</p> <p>3. Ability to interpret the solutions of the equations established in physical terms.</p>	
13.	AMA 204A	Advanced Analysis	Complex	2020	<ol style="list-style-type: none"> 1. Explain the basic properties of complex integration and compute such integrals. 2. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions. 3. Apply advanced techniques to evaluate definite integrals and differential equations in applied areas. 4. Explain general principles of conformal mapping. 5. Compute the residue of a function and use the Residue Theory to evaluate a contour integral or an integral over the real line

14.	AMA 204B	Nonlinear Analysis	2020	<ol style="list-style-type: none"> 1) Explain fixed point theory and its applications by well known theorems. 2) Analyse the approximations in Normed spaces, strict convexity – uniform, Chebyshev polynomials, Hilbert space , splines. 3) Evaluation of spectral theory in normed spaces, finite dimensional normed spaces. 4) Spectral properties of boundary linear operator, compact linear operator, Resolvent and spectrum. 5) Use of complex analysis in spectral theory, Banach algebras.
15.	AMA 205	Measure and Integration	2020	<p>Compute Lebesgue measures.</p> <ol style="list-style-type: none"> 2. Establish the measurability or non-measurability of sets and functions. 3. Approximate measurable functions by simple and step functions. 4 .Compute Lebesgue integrals of bounded functions over a set of finite measure. <p>Explain Fourier analysis.</p> <p>5.Decide under which conditions the fundamental theorem of calculus is</p>

				<p>applicable</p> <p>in the context of Lebesgue integration.</p>
16.	AMA 206	Mathematical Statistics	2020	<p>To learn the fundamental concepts of statistics and techniques required for data analysis.</p> <p>2. To explain stochastic convergence</p> <p>3. To discuss measures of quantity of estimations</p> <p>4. Study confidence intervals of variances.</p> <p>5. Understand Rao-Blackwell theorem and Rao Cramer's inequality</p> <p>6. Able to analyze the data of practical problems.</p>
17.	AMA 301	Continuum Mechanics	2020	<p>1) Be able to describe motion, deformation and forces in a continuum.</p> <p>2) Be able to derive equations of motion and conservation laws for a continuum.</p> <p>3) Understand constitutive models for fluids and viscoelastic solids.</p>

				<p>4) Formulate and solve specific technical problems of displacement, strain and stress.</p> <p>5) Perform experiments with stresses and deformations.</p> <p>Numerically model and analyse the stresses and deformations of simple geometries under an arbitrary load in both solids and liquids</p>
18.	AMA 302	Functional Analysis	2020	<ol style="list-style-type: none"> 1) They can work with different distance metrics and normed spaces. 2) Understand continuous linear transformations and the Hahn-Banach Theorem. 3) Comprehend the Open mapping theorem and Closed graph theorem. 4) Construct orthonormal sets and conjugate spaces. 5) Understand the relevance of self-adjoint operators, normal, unitary operators and projections. 6) Comprehend the ideas of determinants and the spectrum of an operator.

19.	AMA 303A	Differential Geometry	2020	<ol style="list-style-type: none"> 1. Determine and calculate curvature of curves in different coordinate systems. 2. Parameterize surfaces and use the metric tensor. Calculate isometries. 3. Treat geodesic curves and parallel translation. 4. Calculate and analyse curvature of surfaces in different settings. 5. Know the concept of tensor and recognize tensors that are used in mechanics, image processing and theory of relativity.
20.	AMA 303 B	Mathematical Methods	2020	<p>Knows and can use: a) concepts, results and methods from real analysis of single-variable functions related to limits, continuity, differentiation, integration and differential equations. b) concepts, results and methods related to systems of linear equations. c) numerical methods for solving equations, integrals and differential equations.</p> <p>2.Knows some engineering applications of mathematics.</p>
21.	AMA 304	Classical Mechanics	2020	<ol style="list-style-type: none"> 1) Understand D' Alembert's Principle and simple

				<p>applications of the Lagrangian Formulation.</p> <ol style="list-style-type: none"> 2) Derive the Lagrange's Equation from Hamilton's Principle. 3) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems. 4) Distinguish the concept of the Hamilton Equations of Motion and the Principle of Least Action. 5) Get familiar with canonical transformations, conditions of cononicity of a transformation in terms of Lagrange and Poisson brackets.
22.	AMA 305	MAT-LAB	2020	<p>Understand the mathematical operations & functions.</p> <ol style="list-style-type: none"> 2. Write a program to addition & multiplication matrices. 3. Understand the 2-D plotting and 3-D plotting techniques. 4. Solve algebraic and transcendental equations.
23.	AMA 306A	Business Mathematics-I	2020	<ol style="list-style-type: none"> 1. Apply the knowledge in mathematics (algebra, matrices,

				<p>calculus) in solving business problems.</p> <ol style="list-style-type: none"> 2. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and business 3. Explain the Concepts and use Equations, formulae and Mathematical expressions and in a variety of contexts. 4. Understand the Binary ,octal , decimal and hexadecimal system.
24.	AMA 401	Number Theory	2020	<ol style="list-style-type: none"> 1. the Arith Understand metical Functions. 2. Use $\Phi(n)$, $\Pi(n)$, $\mathbb{I}(n)$. 3. Understand the definitions of congruences, residue classes and least residues 4. Apply legendary polynomial and application of reciprocity law.
25.	AMA 402	Fluid Dynamics	2020	<ol style="list-style-type: none"> 1) Be familiar with continuum model of fluid flow and classify fluid/flows based on physical properties of a fluid/flow along with Eulerian and Lagrangian descriptions of fluid motion. 2) Derive and solve equation of

				<p>continuity, equations of motion, vorticity equation, equation of moving boundary surface, pressure equation and equation of impulsive action for a moving inviscid fluid.</p> <p>3) Understand Boundary layer Equations.</p> <p>Solve Analytic Boundary layer equations</p>
26.	AMA 403A	Graph Theory	2020	<p>Able to define basic concepts of graphs</p> <p>2. Utilize the algorithms to find the shortest path, Optimal tree from a given graph</p> <p>3 . Construct the Reliable Communication networks</p> <p>4. Understand the concepts of practical problems like Chinese postman problem and travelling salesman problem.</p>
27.	AMA 403B	Approximation Theory	2020	<p>1) Know the basic concepts of metric space and normed linear space</p> <p>2) Knows existence and uniqueness theorems for the best approximations in various Banach spaces.</p> <p>3) Knows Bernstein's lethargy theorem</p>

				<p>and its practical and theoretical implications.</p> <p>4) Be able to use and analyze the basic methods for polynomial approximations, interpolation.</p>
28.	AMA 404	Operations Research for Industry and Community Development	2020	<ol style="list-style-type: none"> 1) Formulate some real life problems into Linear Programming Problem. 2) Solve linear programming problem by using algebraic graphical method. 3) Use the simplex method to find an optimal vector for the standard linear programming problem and the corresponding dual problem. 4) Prove the optimality condition for feasible vectors for Linear Programming Problem and Dual Linear Programming Problem. 5) Use operations research to solve transportation problems during the allocation of trucks to the formulate operation research models to solve real

				<p>life problem.</p> <p>6) Understand Queuing theory basic concepts and solve queuing theory problems.</p> <p>7) Deterministic inventory models, static economic, classic EOQ models.</p>
29.	AMA 405	Computer Oriented Numerical Methods	2020	<p>Gain Knowledge in C-Language</p> <p>2. Able to use commands operations of C.</p> <p>3. Write the programming to solve problems in numerical methods.</p>
30.	AMA 406A	Business Mathematics-II	2020	<p>1. Able to solve problems on Time and work, Distance</p> <p>2. Understand the mixtures</p> <p>3. Calculate the Simple interest and compound interest.</p> <p>4. Analyse the data from charts and graphs.</p>
31.	AMA 406B	Mathematics for Social Sciences	2020	<p>1. Understand the concepts of vector spaces with bases.</p> <p>2. Discuss algebra of Transformations and orthogonal components.</p> <p>3. Understand the concepts of Limit,</p>

				<p>continuity & differentiation of functions.</p> <p>4. Apply Integrals to find areas, length & volume of regions.</p> <p>5. Apply the numerical Techniques to solve differential equations & Algebraic equations.</p>
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Microbiology

Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
MB-101	Introductory Microbiology	2020	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae

MB-102	Microbial Physiology	2020	Be able to know about the nutrition and microbial growth. Be able to know about photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration. Be able to know in depth about various pathways in protein and nucleotide metabolisms
MB-103	Bio chemistry	2020	Through this course the students are exposed to importance of biological macromolecules. They acquire knowledge in the quantitative and qualitative estimation of biomolecules. They study the influence and role of structure in reactivity of biomolecules. At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions
MB 104	Biophysics and biostatistics	2020	This course imparts the knowledge of basic statistical methods to solve problems Students are taught to operate various statistical software packages. By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research Be able to gain knowledge on basic concepts in statistics.
MB-201	Molecular Biology	2020	The course teaches the students about genes at molecular level. They learn about DNA, RNA and their replication, mutations, DNA repair mechanism. The course outcome is to train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy
MB-202	Recombinant DNA technology	2020	This course teaches RDNA technology techniques and their application in the field of genetic engineering. They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries. Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of

			genetic engineering.
MB 302	b) Bioprocessing of Industrial Microorganism s	2020	Give elaborate knowledge on Health care products. Provide in depth knowledge about microbial antibodies and recombinant products. Provide detailed knowledge about organic acids and enzymes. Gives in depth knowledge on oxidative transformation.
MB-303	a) Pharmaceutical Microbiology	2020	This is an interdisciplinary course that covers the aspects involved in understanding the pharmacokinetics and drug metabolism involving nano-based drug delivery system. The students learn about various pharmacokinetics parameters through mathematical models, design protocol for BA/BE study and its interpretation, design invitro dissolution studies for various drugs. At the end of the course, the students will have the necessary knowledge in the area in pharmacokinetics.
MB-303	b) Down stream processing	2020	The course introduces the analytical methods used in separation science . They learn about various analytical techniques that are routinely used for separation of biomolecules and their components. The course teaches students the advantages of separation science as applied to biotechnology
MB-306 a	Computational biology	2020	This allied paper introduces the students to concepts in bioinformatics. The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems
MB-402	Industrial based Microbial clean technology	2020	Microbial cleaning takes advantage of naturally-occurring microbes to remove a wide variety of contaminants from various surfaces. The method is based on the affinity of microbes for hydrocarbons that are digested, producing harmless carbon dioxide, water, and soluble fatty acids. The microbes are nonpathogenic and are safe to handle and dispose. The process is environmentally-friendly and is less expensive than solvent cleaning, but it is not applicable to high precision cleaning applications. Typical applications include parts washing; oil and grease removal from concrete and other floor

			surfaces, and from drains and grease traps; cleaning and disinfection in healthcare facilities. Able to design procedures, record research methodology and interpret the research
MB-403	a) Industrial production of Microbial product	2020	Microbes are the major components of biological system on this earth. They are present everywhere, even at sites where no other life could possibly exist. Many microbes are useful to human beings. We use microbes and microbial derived products almost every day like curd and other fermented foods like idli, dosa, bread, etc. Microbes are also used in most of the industries. Alcohol, antibiotics, vinegar, etc are important microbial products. Microbes are very helpful in sewage treatment, biogas production and preparation of biofertilizers as well. So it's clear from this chapter that microbes play a very important role in welfare of human society.
	b) Industrial Microbial technology	2020	Students in this course will learn about microbes in food, spoilage of food and preservation techniques of food. Through this course, they also learn about microbiology of milk, fermented diary products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms. At the end of the course, the student will be able to use the preservation techniques for food and use this experience to be employed as quality control experts.

Industrial Microbiology

Course	Title of the	Years	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill
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Code	Course	of Intro ducti on	development
IMB-101	Introductory Microbiology	2020	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
IMB-102	Microbial Physiology	2020	Be able to know about the nutrition and microbial growth. Be able to know about photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration. Be able to know in depth about various pathways in protein and nucleotide metabolisms
IMB-103	Bio chemistry	2020	Through this course the students are exposed to importance of biological macromolecules. They acquire knowledge in the quantitative and qualitative estimation of biomolecules. They study the influence and role of structure in reactivity of biomolecules. At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions
IMB 104	Biophysics and biostatistics	2020	This course imparts the knowledge of basic statistical methods to solve problems Students are taught to operate various statistical software packages. By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research Be able to gain knowledge on basic concepts in statistics.
IMB-201	Molecular	2020	The course teaches the students

	Biology		about genes at molecular level. They learn about DNA, RNA and their replication, mutations, DNA repair mechanism. The course outcome is to train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy
IMB-202	Recombinant DNA technology	2020	This course teaches RDNA technology techniques and their application in the field of genetic engineering. They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries. Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering.
IMB 302	b) Bioprocessing of Industrial Microorganisms	2020	Give elaborate knowledge on Health care products. Provide in depth knowledge about microbial antibodies and recombinant products. Provide detailed knowledge about organic acids and enzymes. Gives in depth knowledge on oxidative transformation.
IMB-303	a) Pharmaceutical Microbiology	2020	This is an interdisciplinary course that covers the aspects involved in understanding the pharmacokinetics and drug metabolism involving nano-based drug delivery system. The students learn about various pharmacokinetics parameters through mathematical models, design protocol for BA/BE study and its interpretation, design invitro dissolution studies for various drugs. At the end of the course, the students will have the necessary knowledge in the area in pharmacokinetics.
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IMB-403	a) Industrial production of Microbial product	2020	Microbes are the major components of biological system on this earth. They are present everywhere, even at sites where no other life could possibly exist. Many microbes are useful to human beings. We use microbes and microbial derived products almost every day like curd and other fermented foods like idli, dosa, bread, etc. Microbes are also used in most of the industries. Alcohol, antibiotics, vinegar, etc are important microbial products. Microbes are very helpful in sewage treatment, biogas production and preparation of biofertilizers as well. So it's clear from this chapter that microbes play a very important role in welfare of human society.
	b) Industrial Microbial technology	2020	Students in this course will learn about microbes in food, spoilage of food and preservation techniques of food. Through this course, they also learn about microbiology of milk, fermented diary products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms. At the end of the course, the student will be able to use the preservation techniques for food and use this experience to be employed as quality control experts.

Physics

Course Code	Title of the Course	Years of Introduction	Course Outcomes
PHY101	Classical Mechanics and Theory of Relativity	2020	<ul style="list-style-type: none"> • Understand the necessity of Action, Lagrangian, and Hamiltonian formalism. • Used D'Alembert principle and calculus of variation to derive the Lagrange equations of motion. • Describe the motion of a mechanical system using Lagrange-Hamilton formalism. • Apply essential features of a relativity problem (like motion under central force, periodic motions) to set up and solve the appropriate physics problems.
PHY102	Solid State Physics	2020	<ul style="list-style-type: none"> • Gain in-depth knowledge about the formation of various crystal structures and perform calculation on their elemental parameters. • Differentiate between various lattice types based on their lattice dynamics and then explain thermal properties of crystalline solids • Understand the electron motion in periodic solids and origin of energy bands in semiconductors. • To explain the basic transport theory for understanding the transport phenomenon in solids
PHY103(a)	Analog and Digital Electronics	2020	<ul style="list-style-type: none"> • Understand working of Different Semiconductor devices (Construction, Working Principles and V-I characteristics) and their applications.

			<ul style="list-style-type: none"> • Explain the construction and working of Operational amplifiers and applications • Design Digital circuits and their applications. • Understand the working of various analog communication techniques
PHY103(b)	Computational Methods & C Language	2020	<ul style="list-style-type: none"> • Apply basic knowledge of computational physics in solving the physics problems. • Program with the C or any other high-level language • Use various numerical methods in solving physics problems. • Analyze the outcome of the algorithm/program graphically.
PHY103(c)	Sensors and Transducers	2020	<ul style="list-style-type: none"> • Apply basic knowledge of sensors and transducers in understanding the measurement systems. • Study and understanding of various types of sensors • Study and understanding of various types of Transducers • Analyze the outcome of the signal conditioners like filters, detectors and amplifiers
PHY104(a)	Atomic and Molecular Physics	2020	<ul style="list-style-type: none"> • Have the basic knowledge of different atomic models, quantum nos and atomic spectra. • Understand the classical/quantum description of effect of magnetic field and Electric field on spectral lines. • Know the different types of rotation of the molecules and rotational constants and intern structure of the molecules. • Study the vibrational spectra of molecules and applications of vibrational spectra of molecules and applications of vibrational spectra
PHY104(b)	Optical, Microwave and Satellite Communications	2020	<ul style="list-style-type: none"> • understand microwave communication system • Understand functioning of Radar systems • Differentiate losses in optical fiber link and state transmission characteristics of optical fiber

PHY104(c)	Computer Architecture and Networking	2020	<ul style="list-style-type: none"> • Understand basics of logic circuits and computer functional blocks • Know machine instructions and assembly languages • Comprehend I/O organization • Appreciate differences between different memory devices
PHY201	Statistical Mechanics	2020	<ul style="list-style-type: none"> • Use ensemble theory to explain the behavior of Physical systems • Explain the statistical behavior of Bose-Einstein and their applications. • Fermi –Dirac Statistics & Fluctuations
PHY202	EM Theory, Lasers & Modern Optics	2020	<ul style="list-style-type: none"> • Understand the electro statistics and magneto statistics and also the properties of propagation of electromagnetic radiation in different media • Know about the properties of laser beam and the working of different lasers and applications • Describe the fourier analysis in optics problems and to understand the concept of holography • Analyze the propagation of light in optical fibers and to know the various applications of optical fibers
PHY203(a)	Nuclear Physics	2020	<ul style="list-style-type: none"> • Understand the basics of nuclear forces and their characteristics and also about various nuclear models • Know the various types of nuclear reactions and nuclear decay system • Understand the basic principles in nuclear accelerators and reactors and also their applications • Describe the various elementary particles and their conservation layers.
PHY203(c)	IC fabrication	2020	<ul style="list-style-type: none"> • Understand and compare crystal growth and Epitaxial

b)	Techniques		<p>deposition techniques</p> <ul style="list-style-type: none"> • Understand structure and process of oxidation • Study the diffusion processes • Understand vacuum deposition techniques
PHY203(c)	Advanced Microprocessors And its Applications	2020	<ul style="list-style-type: none"> • Understanding of microprocessor architecture and evaluation • Develop skill of writing programs in ALP for various applications of 8085 & 8051 • Interface various peripherals with 8085 & 8051. • Understanding interrupts and direct memory access
PHY204(a)	Mathematical Physics	2020	<ul style="list-style-type: none"> • Understand the basics and applications of special functions in all the branches of Physics. • Use Fourier series and transformations as an aid for analyzing physical problems. • Apply integral transform to solve mathematical problems of Physics interest • Formulate and express a physical law in terms of complex variables and simplify it by use of coordinate transforms.
PHY204(b)	Introduction to VLSI design	2020	<ul style="list-style-type: none"> • Demonstrate a clear understanding of CMOS fabrication flow and technology scaling. • Analyze CMOS based logic circuit • Realize logic circuits with different design styles • Understand Front & Back end design aspects of simple VLSI Digital circuits
PHY204(c)	Material Science For Industrial	2020	<ul style="list-style-type: none"> • Understand various experimental techniques for desc

	Applications		<ul style="list-style-type: none"> ribing interaction of organic materials • Use error analysis for experimental data. • Knowledge about the different types of the Liquid crystals • Apply the knowledge of phase transformations for various applications
PHY301	Introductory Quantum Mechanics	2020	<ul style="list-style-type: none"> • Understand the need for quantum mechanical formalism and its basic principles. • Appreciate the importance and implication of vector spaces, Dirac Ket Bra notations, eigen value problem. • Understand the need of approximate methods in solving problems • Understanding scattering theory and its importance.
PHY302	Physics of Semiconductor Devices	2020	<ul style="list-style-type: none"> • Understand various experimental techniques for semiconductor junctions and interfaces • Use I-V characteristics to understand the function of devices • Apply the knowledge of Junction transistors for various applications • To get familiarization with Power Devices and Semiconductor Technology
PHY303(a)	.Applied Spectroscopy	2020	<ul style="list-style-type: none"> • Understand the rotational and vibrational spectra of dimolecules and their applications in structure determinations. • Know the Raman effect and its use in the structural analysis of various molecules. • Have the knowledge about various spectrophotometer and the functioning of various parts in

			<p>SPECTROPHOTOMETER.</p> <ul style="list-style-type: none"> • Understand the basic concepts of fluorescence and phosphorescence their applications in different fields
PHY303(b)	Condensed Matter Physics	2020	<ul style="list-style-type: none"> • They gain knowledge on elastic properties of solids and its importance. • Differentiate they gain knowledge on specific heat and Thermal importance. • Understand the importance of Fermisurface in electrical properties of Solids. • Gain knowledge on photoconductivity and its origin
PHY303(c)	3.Embedded Systems	2020	<ul style="list-style-type: none"> • understand about the basic functions and structure of embedded systems • Get familiarized with Embedded system Design Tools and Hardware • understand about the basic programming concepts of embedded systems • know about the applications of PIC microcontrollers
PHY305	Advances in Physics	2020	<ul style="list-style-type: none"> • Understand the concepts of nanotechnology • Physical and chemical techniques of nanomaterial synthesis • Concepts of Nano materials and Nano devices • Basics of remote sensing and understanding the concepts of Geographical Information system
PHY306(a)	Basic Spectroscopic Techniques	2020	<ul style="list-style-type: none"> • HavethebasicknowledgeofBohr's-SommerfieldQuantumtheoryofhydrogenlikeatom • Understandclassical/quantumdescriptionofelectronicspect

			<p>rao atom and molecules</p> <ul style="list-style-type: none"> • Use microwave and Raman Spectroscopy for analysis of known molecules • Correlate infrared spectroscopic information of known molecules with their physical description
PHY306(b)	Nanomaterials and Devices	2020	<ul style="list-style-type: none"> • Understanding the basics of nanomaterials • Acquire knowledge of basic approaches to synthesize nanomaterials • Understand the physical and chemical properties of carbon nano tubes and nano structured materials. • Introduction to nanodevices
PHY401	Advanced Quantum Mechanics	2020	<ul style="list-style-type: none"> • Understand the concept of identifiable particles • Understand the Orbital Angular momentum spin angular momentum and general angular momentum and their importance in spectroscopy • Apply the symmetries principles in calculating the conserved currents and charges.
PHY402	Physics of Advanced Materials	2020	<ul style="list-style-type: none"> • Gain in-depth knowledge about the formation of various crystal • Growth techniques • Understand the properties dielectric and ferroelectric materials • Understand different on Ferro and Anti ferro and ferro magnetism and their applications • Study functional materials

PHY403(a)	Photonics	2020	<ul style="list-style-type: none"> • In depth knowledge on different lasers and their application • Importance of Fiber optics and their components in communication and sensors • Significance and role of waveguides and optics in integrated optics • Advances in photonic crystals, circuits and applications with respect to conventional devices.
PHY403(b)	Solar Energy- Thermal and Photovoltaic Properties	2020	<ul style="list-style-type: none"> • Understand the thermal and light components of solar energy, basic concepts and measurement of solar radiation. • Learn the theoretical aspects of solar collectors, performance evaluation and application. • Know the concepts of solar cells, types and fabrication procedures of source solar cells. • Provide knowledge on cell efficiency measurements.
PHY403(c)	Vacuum and Thin Film Technology	2020	<ul style="list-style-type: none"> • Basic theoretical concepts of the kinetic theory of gases applicable to vacuum technology and also the principles and construction of various vacuum pumps and gauges. • Design and construction of various techniques for the preparation of thin films • Theoretical aspects to understand the growth and properties of thin films • Various industrial applications of thin films
PHY405	Advanced Characterization Techniques	2020	<ul style="list-style-type: none"> • Describe various Instrumentation – Essential parts of spectrophotometer. • Understand theoretical techniques Resonance Spectrometers and Mass Spectrometer • Understand use of various spectroscopic techniques and their

			<p>application to the various fields of physics.</p> <ul style="list-style-type: none"> • Understand the Advanced Spectroscopic and Microscopic Techniques
PHY406(a)	Wireless Communications	2020	<ul style="list-style-type: none"> • understand the basics of digital modulation techniques • Understand various coding and error correction techniques • Know GSM mobile communication standards, its architecture, logical channels, advantages and limitations. • Familiarize with optical and satellite communication techniques
PHY406(b)	Vacuum Technology & Applications	2020	<ul style="list-style-type: none"> • Basic theoretical concepts of the kinetic theory of gases applicable to vacuum technology and also the principles and construction of various vacuum pumps and gages for the production and measurement of vacuum • Design and construction of various components for the construction of vacuum systems for the preparation of thin films • Various techniques used for the growth of thin films • Various industrial applications of vacuum technology and thin films

Instrumentation

Course Code	Title of the Course	Years of Introduction	Course Outcomes
INS –101	1.Introduction to	2020	<ul style="list-style-type: none"> • Understand fundamentals of Instrumentation system

	Instrumentation and Control System		<ul style="list-style-type: none"> • Understand and design open loop and closed loop control system • Understand time response analysis • Design and Analysis of Root Locus ,Frequency Response Systems
INS – 102	2. Analog Devices and Industrial Electronics	2020	<ul style="list-style-type: none"> • Understand and describe specifications, features and capabilities of electronic devices. • Understand the basics of operational amplifiers and their applications • Understand fundamental of semiconductors and power devices • Select appropriate device for circuit operation.
INS - 103(a)	1. Digital Techniques and Principles of Communications	2020	<ul style="list-style-type: none"> • Learn working and applications of FET and MOSFET. • Learn the basics of op-amps. • Learn the importance of digital electronics. • Learn the process of communication and its importance.
INS - 103(b)	2. Power Electronics	2020	<ul style="list-style-type: none"> • Students will be able to understand the working of FET, JFET, MOSFET. □□□□ Understand working of Controlled Rectifiers, Inverters and DC to DC converters. □□□□ Understand the inverters • Understand the Working of AC/DC Drives.
INS - 103(c)	3. Industrial Product Instrumentation	2020	<p>Design the instruments Learn the hardware design Learn the digital design Learn the PCB design</p>
INS - 104(a)	1. Programming in “C”	2020	<ul style="list-style-type: none"> • Understand the basic principles of C language.

			<ul style="list-style-type: none"> • Understand To teach basic Programs in C Language. • Understand the simple Array Programs in C Language. • Understand the File management and Linked List Programs.
INS - 104(b)	2. Renewable Sources of Energy	2020	<ul style="list-style-type: none"> • Understand about different energy sources • Learn the importance of Solar energy • Learn the usage of wind energy • Learn the importance of bio-mass energy
INS - 104(c)	3.Opto Electronics	2020	<ul style="list-style-type: none"> • Learn fundamentals of laser and their applications • Know the different optical sources and detectors • Understand the optical components and instruments • Learn the basics of optical fibres and its applications
INS – 201	1.Industrial Instrumentation	2020	<ul style="list-style-type: none"> • learnthe introduction in Process Instrumentation . • learnTo teach the Instrumentation in Iron and Steel Industries. • learn the Instrumentation in Petrochemical. • know the Instrumentation in Pharmacy and Thermal Power Stations.
INS – 202	2. Electronic Instrumentation	2020	<ul style="list-style-type: none"> • Learn about analogue Measuring Instruments • Learn Principle, operation and construction and details of analog and digital measuring instrumentation. • analyze and design function generator, square wave generator and digital multi meter. • Learn Spectrum Analyzers, Frequency Synthesizers, Digital tachometer,Digital watt meterDigital Capacitance meter

INS - 203(a)	1. Sensors and Signal Conditioners	2020	<ul style="list-style-type: none"> • Understand fundamentals of sensor/Transducers • Understand the concept of Signal Conditioners. • Understand the concepts Temperature transducer , flow transducer and level sensors • Learn Pressure Transducers, Manometers and Elastic transducers
INS - 203(b)	2.Network Analysis	2020	<ul style="list-style-type: none"> • Under stand different Network theorems • Lear the use of Laplace Transform in the Network Analysis • Under stand the concept of complex frequency • Learn the concepts in Resonance in series and parallel circuits
INS - 203(c)	3. Spectroscopic Instrumentation	2020	<ul style="list-style-type: none"> • Understand the basics of Molecular Spectroscopy • Understand the basics of RAMAN Spectroscopy • Understand the basics of Spectrophotometry • Understand the basics of Fluorescence and Phosphorescence Spectroscopy
INS - 204(a)	1.Microprocessors and Interfacing	2020	<ul style="list-style-type: none"> • learn assembly programming language • demonstrate the knowledge of addressing modes, instruction sets. • able to analyze and design assembly level programmes and timing diagrams. • able to analyze programmable peripheral devices, 8255, 8257/8237, 8259.

INS - 204(b)	2. Robotics	2020	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> To develop the student's knowledge in various robot structures and their workspace. • To develop student's skills in performing spatial transformations associated with rigid body motions. <input type="checkbox"/> <input type="checkbox"/> To develop student's skills in perform kinematics analysis of robot systems. • To provide the student with knowledge of the singularity issues associated with the operation
INS - 204(c)	3. Electronic Measurement Instruments	2020	<ul style="list-style-type: none"> • Learn the static and Dynamic characteristics of instruments, • Learn the signal Converters: I To P / P To I Converter • Understand the electronic Instruments for Measuring Basic Parameters • Understand the Instrument for Generation and Analysis of Waveforms
INS – 301	1. Analytical Instrumentation	2020	<ul style="list-style-type: none"> • The Students get will be versed with the principles, construction and working of various analytical instruments.. • Students get details information about the applications of analytical techniques in medicine, industry etc. • Understand the Polarographs • Understand the NMR and ESR Spectrometers
INS – 302	2. Digital Signal Processing	2020	<ul style="list-style-type: none"> • Gain knowledge on the basic elements of Digital Signal Processing • Learn the analysis of discrete-time systems

			<ul style="list-style-type: none"> • Understand the discrete Fourier Transform • Learn design of digital IIR filters:
INS - 303(a)	1. Biomedical Instrumentation	2020	<ul style="list-style-type: none"> • Identify various Bio-potential and their specification in terms of amplitude and frequency. • Decide the applications of therapeutic instruments for treatment purpose. • Decide the applications of therapeutic instruments for treatment purpose. • Understand applications of imaging instruments and the modalities involved in each technique.
INS - 303(b)	2. Micro Electro Mechanical Systems	2020	<ul style="list-style-type: none"> • Basic structure of MEMS and design • Learn Scaling laws in miniaturization • Analyze applications of MEMS and their importance as sensors • Understand the Microsystem Design and its considerations
INS - 303(c)	3. Instrumentation for Environmental Science	2020	<ul style="list-style-type: none"> • Learn necessity of instrumentation & control for environment • Gain knowledge in Ground water monitoring and waste water monitoring • Learn the effects of air pollution • Understand air monitoring. Flow monitoring and Rain water harvesting
INS – 304	Analytical Instrumentation Lab	2020	<ul style="list-style-type: none"> • .Understand the fundamentals of microcontroller. • Understand . addressing modes, Instructions and

			<p>programming in 8051</p> <ul style="list-style-type: none"> • Understand 8051 Memory and I/O device Interfacing. Interrupts and Timer/counters • Learn 8051 Memory and I/O device Interfacing
INS – 305	Microcontrollers and Interfacing	2020	<ul style="list-style-type: none"> • Understand internal block diagram of computer • know the Micro Programmed Control and organization of computer • Know The Memory System and Input-Output Organization • Know the Pipeline And Vector Processing
INS - 306(b)	1. Industrial Organization and Management	2020	<ul style="list-style-type: none"> • Learn the basics Industrial Management and Business organization • Learn the Quality, Inspection and Environment Management • Learn the Production Planning, Inventory Control and Supply Chain Management • Learn the Human Resources Management
INS - 401	1. Introduction to VLSI Circuits	2020	<ul style="list-style-type: none"> • Understand the fundamentals of VLSI systems • Learn the physical Structure and Fabrication of CMOS ICs. • Understand the elements of Physical Design and Electrical Characteristics of MOSFETs • Understand the electronic analysis of CMOS logic gates
INS – 402	2. Embedded Systems	2020	<ul style="list-style-type: none"> • Learn the basics of embedded systems and pic

	and Real time Operating Systems		<p>microcontroller</p> <ul style="list-style-type: none"> • Understand the concepts of ARM processors and architecture of ARM 7 • Learn the real time operating systems and concepts • Understand the RTOS application domains
INS - 403(a)	1. Programmable Logic Controllers	2020	<ul style="list-style-type: none"> • Learn Process Dynamics and Process Control Action • Learn Process Controllers and Tuning • Learn Analysis of Control Loop • Learn Multivariable Control and Intelligent Controllers
INS - 403(b)	2. Computational Mathematics	2020	<ul style="list-style-type: none"> • Learn the basics of Special Functions and their importance in different fields • Learn the fundamentals of Integral Transforms and its applications in communications • Understand the different numerical techniques and their applications • Understand the complex Variables and their importance
INS - 403(c)	3. Electrical Engineering Materials	2020	<ul style="list-style-type: none"> • Learn the concepts of bonding and different crystal systems • Understand the concepts different polarizations and importance of dielectrics • Learn the basics of semiconductors and their importance in devices • Learn the basics of shape memory alloys and its importance
INS – 405	Project Work	2020	<ul style="list-style-type: none"> • Get the experience of working on a problem independently with planning and execution. • Develop skills related to presentation of data, analysis discussion of the results and draw conclusions • Learn the importance of research for development and self

			<p>sustaining</p> <ul style="list-style-type: none"> • Understand the need of the society
INS - 406(a)	1. Agro Based Instrumentation	2020	<ul style="list-style-type: none"> • Understand the Properties of Soil. • Understand the concept of flow diagram of Sugar Plant. • Understand the role of Irrigation System . • Understand the working of SCADA and DMA in agriculture.
INS - 406(b)	2. Industrial Automation	2020	<ul style="list-style-type: none"> • Define automation, it's importance, expectations from automation and applications in industry. • Understand the working of these systems and should be able to determine hardware and software requirements of SIS and SIL. • Understand evolution and architecture of DCS, hierarchical control in DCS, programming DCS • Understand the fundamentals of Open loop and Closed loop controls

Electronics

Course Code	Title of the Course	Years of Introduction	Course Outcomes
ELE-101	Analog Integrated Circuits and Applications	2020	<ul style="list-style-type: none"> ➤ Understand the necessity of Action, Voltage regulators and Signal generators. ➤ Used ' Nonlinear Circuits, Amplifiers, and Phase-Locked Loops in various applications. ➤ Describe the A-D and D-A Converters in different applications. ➤ Apply essential features of Op. Amp. Applications used in the Industry.
ELE-102	Digital Integrated	2020	<ul style="list-style-type: none"> ➤ Gain in-depth knowledge about the Flip-Flops, Counters

	Circuits and Applications		<p>and Registers and their symbols used in digital integrated circuits and their function.</p> <ul style="list-style-type: none"> ➤ Differentiate various IC Logic families used in digital circuits. ➤ Understand the various semiconductor memories such as RAMs and ROMs, Programmable Logic devices and development software. ➤ To explain the basic function of various digital instruments such as DVMs, MP based Ramp type DVM, Digital multimeters, Frequency meter, Phase meter, capacitance meter and their Automation.
ELE-103 (a)	Programming in C with data structures	2020	<ul style="list-style-type: none"> ➤ Understand the fundamentals of C Language such as Expressions and I/O Statements, Operators and control statements. ➤ Explain the arrays, User Define Functions, Pointers and their applications ➤ Understand about Declaration of structure, Stack and Recursion and their applications. ➤ Understand the Linked Lists, Trees, different Algorithms, and their Applications. They are able to write the programs in controlling devices.
ELE-103 (b)	Python Programming	2020	<ul style="list-style-type: none"> ➤ Understand the basics of Dynamic Types, Conventions, String Operations, Operators, Loop, Lists and functions. ➤ Learn about Object and Classes in Python and compare with any other high-level language. ➤ Use Functions and Modules in solving various problems. ➤ Understand I/O and Error Handling in Python, solve the problems.

ELE-103 (c)	Programming in Matlab	2020	<ul style="list-style-type: none"> ➤ Applybasicknowledgeof various instructions in Matlab and script files. ➤ Study and understanding of various control flow instructions. ➤ Study and understanding of various Structured Data Types ➤ AnalyzetheoutcomeofthePlotting in Mat lab,Handle Graphics for Manipulating Plots, Writing the programs in solving the problems for various applications.
ELE-104 (a)	Mathematical Methods of Signal & System analysis	2020	<ul style="list-style-type: none"> ➤ Havethebasicknowledgeof different Continuous-Time and Discrete-Time Signalsand systems and their properties. ➤ Understand the <i>Fourier Series Representation of Periodic Signals</i>and their properties. ➤ Know the Properties, Analysis and Characterization of LTI systems using the Laplace transforms. ➤ Study the Properties of the Z- Transform, Analysis and Characterization of LTI systems using the z-transforms.
ELE-104 (b)	Optical Communications	2020	<ul style="list-style-type: none"> ➤ Understand optical fibers and waveguides used in communication system ➤ Understand Attenuation and wave propagation in Optical Fibers. ➤ Study different types sources and detectors used in Optical Communication system. ➤ Differentiate losses in optical fiber link and state transmission characteristics of optical fiber
ELE-104 (c)	Wireless communications	2020	<ul style="list-style-type: none"> ➤ Understand the basics of digital modulation techniques ➤ Understand various coding and error correction techniques ➤ Know GSM mobile communication standards, its

			<p>architecture, logical channels, advantages and limitations.</p> <ul style="list-style-type: none"> ➤ Familiarize with optical and satellite communication techniques
ELEP-105	Analog and Digital IC's (Lab)	2020	
ELEP-106	Programming in C (Lab)	2020	
ELE-201	Advanced Microprocessors and Microcomputers	2020	<ul style="list-style-type: none"> ➤ Understanding of microprocessor architecture and evaluation ➤ Develop skill of writing programs in ALP for various applications of 8086 Microprocessor ➤ Interface various peripherals with 8086. ➤ Understanding interrupts and direct memory access
ELE-202	Digital Communications	2020	<ul style="list-style-type: none"> ➤ Understand the electro statistics and magneto statistics and also the properties of propagation of electromagnetic radiation in different media ➤ Know about the properties of laser beam and the working of different lasers and applications ➤ Describe the fourier analysis in optics problems and to understand the concept of holography ➤ Analyze the propagation of light in optical fibers and to know the various applications of optical fibers
ELE-203(a)	Semiconductor Materials and Devices	2020	<ul style="list-style-type: none"> ➤ Understand various experimental techniques for semiconductor junctions and interfaces, I-V characteristics to understand the function of devices. ➤ To understand the function of Solid State Microwave devices. ➤ To understand the various Power semiconductor devices

			<p>and their applications</p> <ul style="list-style-type: none"> ➤ To get familiarization with Optoelectronic Devices and their properties.
ELE-203(b)	Sensors and Transducers	2020	<ul style="list-style-type: none"> ➤ Apply basics knowledge of sensors and transducers in understanding the measurement systems. ➤ Study and understanding of various types of Displacement and Strain Transducers ➤ Study and understanding of various types of Pressure transducers ➤ Study and understanding of Opto -Electronic Transducers
ELE-203(c)	Atmospheric and Space Instrumentation Techniques	2020	<ul style="list-style-type: none"> ➤ Understanding of Dynamics atmospheric structure ➤ Understand the various elements in the atmosphere. ➤ Understanding of various Ground Based Instruments for the Measurement of atmospheric elements. ➤ Enrich the measurement techniques such as Radars.
ELE-204 (a)	Control Systems	2020	<ul style="list-style-type: none"> ➤ Understand the basics and applications of open loop and closed loop , Mathematical modelling of dynamic systems. ➤ Know the <i>Transient and steady-state response analysis</i> in control systems. ➤ Understanding of Root Locus analysis. ➤ Design the control systems using frequency response.
ELE-204 (b)	Medical Instrumentation	2020	<ul style="list-style-type: none"> ➤ Understanding of Bio-signal analysis and recording. ➤ Understanding of Physiological Assist Devices such as Pacemakers, Defibrillators, Nerve and Muscle Stimulators, Heart Lung Machine, Kidney Machine and Special Equipment. ➤ Use of Biotelemetry and Operation Theatre Equipment ➤ Understanding of safety and Advanced Biomedical Instrumentation techniques.

ELE-204 (c)	Data Mining and Information Security	2020	<ul style="list-style-type: none"> ➤ Understand Data warehousing components ➤ Understanding of Data mining metrics, data mining tasks, and exploratory Data Analysis. ➤ Knowledge about the Security Trends and different algorithms. ➤ Apply the knowledge of Cryptography techniques for Digital Signatures and Authentication Protocols.
ELE-301	Digital Signal Processing	2020	<ul style="list-style-type: none"> ➤ Understand the need for Sampling of Continuous-Time signals and its basic principles. ➤ Understand the need of Structures for Discrete-time systems ➤ Understand the need of Discrete Fourier Transform methods in solving problem ➤ Understanding the Architecture of TMS320C5X processor, assembly language instructions and its importance.
ELE-302	Digital system Design-VHDL	2020	<ul style="list-style-type: none"> ➤ Understand various Basic Language Elements and model analysis. ➤ Understand Data flow and structural modeling. ➤ Apply the knowledge Subprograms, Overloading, Packages and Libraries for various applications ➤ To get familiarization with Advanced features for Model simulation
ELE-303(a)	Microcontrollers and Applications	2020	<ul style="list-style-type: none"> ➤ Understand about the basic functions and structure of Microcontrollers such as 8051. ➤ Get familiarized with 8051 controllers ➤ understand about the basic Atmel microcontrollers and programming ➤ Understanding of PIC 16F8XX flash microcontrollers and

			their interfacing with I/O devices for industrial applications
ELE-303(b)	Computer organization	2020	<ul style="list-style-type: none"> ➤ Understand basics of structures of Computers. ➤ Know Register Transfer language and micro operations ➤ Understand Microprogrammed control, Computer Arithmetic and Memory system. ➤ Input-Output Organization, Pipeline and Vector Processing.
ELE-303(c)	Digital Image Processing	2020	<ul style="list-style-type: none"> ➤ understand about the Fundamentals of Image Processing ➤ Get familiarized with Image enhancement. ➤ Understand about the Image Segmentation and Feature Analysis. ➤ Understand about the Multi Resolution Analysis and Compressions.
ELE-305	Peripheral interface controllers VHDL & Microcontrollers (Lab) (Hands on training)	2020	<ul style="list-style-type: none"> ➤ understand about the basics of Assembler and Assembler Programs ➤ Get familiarized with PIC microcontrollers and interfacing I/O devices.
ELE-306 (a)	Microprocessors, PC Hardware and Interfacing	2020	<ul style="list-style-type: none"> ➤ Have the basic knowledge of 8086 Based system design and peripheral interfaces ➤ Understand the Motherboard of IBM PC ➤ Understand with Peripherals ➤ Understand about I/O Serial and Parallel ports.
ELE-306 (b)	Satellite Communications	2020	<ul style="list-style-type: none"> ➤ Understanding the basics of Satellite Communication ➤ Acquire knowledge of Multiple Access Techniques ➤ Understand the Satellite Orbits and Inclination. ➤ Understanding of Satellite systems, Indian satellites and applications

ELE-401	Advanced Communication Systems	2020	<ul style="list-style-type: none"> ➤ Understand the Cellular concept. ➤ Understand the Mobile Radio propagation and channel coding ➤ Understand the Multiple Radio Access, Multiple Division Techniques, Channel Allocation. ➤ Know the Optical, Satellite communications and their applications.
ELE-402	Introduction to VLSI circuits	2020	<ul style="list-style-type: none"> ➤ Demonstrate a clear understanding of CMOS fabrication flow and technology scaling. ➤ Analyze CMOS based logic circuit ➤ Realize logic circuits with different design styles ➤ Analysis of CMOS Logic Circuits and Designing High-speed CMOS Logic Networks.
ELE-403(a)	Data Communications and Networking	2020	<ul style="list-style-type: none"> ➤ Understand the basic concepts networks and Transmission of digital data. ➤ Know the different types of Multiplexing and Data link protocols. ➤ Understand the various types of local area networks. ➤ Understand the ISDN, ATM, SONET and related frames and protocols.
ELE-403(b)	Industrial Electronics	2020	<ul style="list-style-type: none"> ➤ Understand the Solid State Devices Used in Industrial Logic Circuits. ➤ Know the use of Solid state Devices in Power electronics. ➤ Understand input and output devices such as sensors and drives. ➤ Know the Types of robots and their function in the Industry.
ELE-403(c)	EMI and EMC	2020	<ul style="list-style-type: none"> ➤ Understanding of EMI Environment. ➤ Know the Specifications, Standards, Limits of EMI. ➤ Know the Grounding principles and Bonding guidelines. ➤ Understanding the theory of Shielding, Need of Gaskets and their properties, Basic Filter Component

			Characteristics and guidelines.
ELE-406 (a)	Embedded systems with PIC Microcontrollers	2020	<ul style="list-style-type: none"> ➤ Understanding of the basics and Characteristics of IoT, IoT development boards. ➤ Know the Wireless Technologies. ➤ Know the data handling and analysis of the data. ➤ The use of IoT for Automation, Management, Logistics, Agriculture, Health and Lifestyle, Industry.
ELE-406 (b)	Microwaves	2020	<ul style="list-style-type: none"> ➤ Understanding of Electromagnetic Theory ➤ Understanding of Transmission line theory ➤ Know different types of Waveguides. ➤ Use of various types of antennas.

Psychology

Course Code	Title of the Course	Years of Introduction	Course Outcomes
PSY 101	General Psychology-I (CC)	2020	<ol style="list-style-type: none"> 1. Understood the concepts and scope of psychology 2. Comprehended the biological basis of behavior 3. Studied the perception and sensation 4. Understood the concepts and learning theories
PSY 102	Social Psychology (CC)	2020	<ol style="list-style-type: none"> 1. Understood the concepts of social psychology 2. Comprehended the social perception and cognition. 3. Studied the Socialization 4. Understood the meaning and theories attitudes
PSY 103A	a. Psychopathology-I (CF)	2020	<ol style="list-style-type: none"> 1. Understood the meaning abnormal behavior and historical and current trends 2. Comprehended the models of abnormal behaviour and

			<p>approaches to therapies</p> <ol style="list-style-type: none"> 3. Learned about classification and assessment of abnormal behaviour 4. Able to evaluate different approaches to therapies for abnormal behaviour
PSY 103B	b. Psychological Measurement-I(CF)	2020	<ol style="list-style-type: none"> 1. Understood the assessment and psychological measurements 2. Comprehended the development of psychological tests and principles of test construction. 3. Learned the Principles of Test Construction 4. Understood the test Development and test Standardization Procedures
PSY 103C	c. Positive Psychology (CF)	2020	<ol style="list-style-type: none"> 1. Understood the human strength of positive psychology 2. Acquainted students with positive subjective states and processes 3. Enabled students to appreciate importance of positive Individual Traits 4. Understood the Positive behaviour in Institutions
PSY 104A	a. Child Development Psychology	2020	<ol style="list-style-type: none"> 1. Exposed the students to the basics of Child Development 2. Helped the student understand research in child development 3. Understood the biological development of a child 4. Able to evaluated personality development of a child
PSY 104B	b. Psychological Measurement & Statistics	2020	<ol style="list-style-type: none"> 1. The students acquainted with intelligence and achievement tests 2. The students learned the measurement of personality tests

			<ol style="list-style-type: none"> 3. They are clear in understanding the Statistics for Psychological Measurement 4. They have knowledge on Distribution of Scores on Variables.
PSY 104C	c. Forensic Psychology	2020	<ol style="list-style-type: none"> 1. Exposed the student to the basics of forensic Psychology 2. Students understood the concept of psychology of Crime 3. They acquainted knowledge on psychological investigation of Crime 4. Students understood psychology of violence of various forms.
PSY 201	General Psychology - II (CC)	2020	<ol style="list-style-type: none"> 1. The students understood the fundamentals of motivation and emotion 2. They understood the basic concepts of memory and forgetting 3. Comprehended the thinking and intelligence 4. Able to evaluated the personality of individuals
PSY 202	Applied Social Psychology-(CC)	2020	<ol style="list-style-type: none"> 1. Students understood about Social Influence 2. Acquainted with social exchange process in social behaviour. 3. Comprehended the prejudice and discrimination 4. To understand what is psychological groups and individuals.
PSY 203A	a. Psychopathology-II(CF)	2020	<ol style="list-style-type: none"> 1. Understood anxiety and mood disorders 2. Acquainted with somatic disorders.

			<p>3. Studied Psychosis and Cognitive Disorders</p> <p>4. Understood Psychological Disorders Across the Life Span</p>
PSY 203B	b. Psycho-Diagnosis (CF)	2020	<ol style="list-style-type: none"> 1. Acquired the knowledge of psychological tests and their use in diagnosis. 2. Students are able to diagnose patients with the help of projective tests. 3. Understood of different diagnostic systems. 4. Learned how to take case history of patients and to make differential diagnosis
PSY 203C	c. Computer Application in Psychological Research-(CF)	2020	<ol style="list-style-type: none"> 1. Understood the basic components of computer 2. Acquainted with Ms Office, power point and internet services. 3. Comprehended the application of computer knowledge through creating emails, scientific journals and data scoring 4. Able to understand Statistical Packages and its application
PSY 204A	a. Life Span Development Psychology : Infancy to Adolescence (Prenatal to Adolescents)	2020	<ol style="list-style-type: none"> 1. To understand human development 2. The students became aware of infancy and babyhood 3. To comprehend the Early and Late Childhood and Adolescence. 4. The students are aware of the development of Adolescence
PSY 204B	b. Consumer Behavior	2020	<ol style="list-style-type: none"> 1. The students understood the concept of consumer behaviour and market research

			<ol style="list-style-type: none"> 2. Comprehended the economic theory of buyer behaviour 3. Studied the effect of psychological theories of motives 4. Acquainted with the advertisement - advertisement purposes-role of communication
PSY 204C	c. Industrial & Organizational Psychology	2020	<ol style="list-style-type: none"> 1. Understood the psychological, social and economic contribution in developing industrial psychology. 2. Comprehended the personal psychology 3. Have knowledge the selection, interviews and evaluation. 4. Comprehended the employment interview
PSY 301	Counseling Psychology (CC)	2020	<ol style="list-style-type: none"> 1. Understood the meaning of counseling and ethics in counseling 2. Comprehended the process of counseling and techniques 3. Understood the counseling process 4. Acquainted with the counseling techniques
PSY 302	Psychology of Personality (CC)	2020	<ol style="list-style-type: none"> 1. Understood nature of personality. 2. Realized the determinants of personality 3. Found that the development of Personality. 4. Understood the Assessment of personality.
PSY 303A	a. Organizational Behavior & HRM (GE)	2020	<ol style="list-style-type: none"> a. The students understood organization and the Individual differences b. Comprehended the motivation and leadership c. They realized how to take decision making and organizational effectiveness.

			d. The students are aware of organizational change due to development
PSY 303B	b. Therapeutic Approaches in Counseling-I	2020	<ol style="list-style-type: none"> 1. enabled the student to have an insight into the psychoanalytic Approach in counseling 2. The student have understood the behaviour therapy 3. They become aware of the procedures involved in the person centered Approach in counseling. 4. Understood the concept and application of Existential Therapy
PSY 303C	c. Health Psychology(GE)	2020	<ol style="list-style-type: none"> 1. Understood the concept of the Health psychology 2. Acquainted with and health behaviour. 3. Comprehended the health behaviour enhancement and management 4. Realized the future of the health psychology.
PSY 305	Stress Management Theory & Practical	2020	<ol style="list-style-type: none"> 1. To introduce meaning of stress and psychophysiology 2. To realize the illness/disease and intervention 3. To understand the techniques of stress management 4. To comprehend and implement the techniques of stress management and counseling
PSY 306	Personality Development (OE)	2020	<ol style="list-style-type: none"> 1. Studied biological, psychological determinants 2. The students aware of socio cultural determinants & Soft Skills 3. The students acquainted with soft skills 4. They learned more on Soft skills
PSY 401	Therapeutic Approaches in Counseling-II(CC)	2020	<ol style="list-style-type: none"> 1. To enable the student to have an insight into the Gestalt Therapy 2. To acquaint with the therapeutic Approach to the Reality Therapy

			<ol style="list-style-type: none"> 3. To enable the students to cognitive behaviour therapy 4. The students involved in the An Integrative Approach
PSY 402	Theories of Personality (CC)	2020	<ol style="list-style-type: none"> 1. Understood the Psychoanalytic Approach 2. Learned on behavioural approaches to personality. 3. The students comprehended the Humanistic approach 4. The students acquainted with the eastern theories of personality
PSY 403A	a. Research Methodology-(GE)	2020	<ol style="list-style-type: none"> 1. Understood basic research and applied research including experimental research. 2. The students comprehended the problem & hypothesis 3. Gained knowledge on Sampling & Data Collection 4. Understood the application of research designs
PSY 403B	b. Organizational Development (GE)	2020	<ol style="list-style-type: none"> 1. Learned the assessment, instructional objectives. 2. Applied the knowledge of training and development incorporating the findings of research 3. Studied the transfer and maintenance of training and alternative training media 4. Gained the evaluating training effectiveness
PSY 403C	c. Rehabilitation Psychology (GE)	2020	<ol style="list-style-type: none"> 1. The students understood historical development – Models of disabilities in the past and present scenario 2. The students comprehended Assessment of Disability, Psychological Aspects 3. The students are aware of Behavioral Management 4. They acquainted with Organizational services
PSY 406	Life Skills (OE)	2020	<ol style="list-style-type: none"> 1. Learned the concept of life skills and its importance

			<p>in relation to personality development of an individual.</p> <ol style="list-style-type: none"> 2. They became aware of the components of life skills and the method of imparting knowledge of life skills. 3. The students have learned more on Life Skills in Specific 4. They acquainted with Self management skills
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Counselling Psychology

Course Code	Title of the Course	Years of Introduction	Course Outcomes
PSY 101	General Psychology-I (CC)	2020	<ol style="list-style-type: none"> 5. Understood the concepts and scope of psychology 6. Comprehended the biological basis of behavior 7. Studied the perception and sensation 8. Understood the concepts and learning theories
PSY 102	Social Psychology (CC)	2020	<ol style="list-style-type: none"> 5. Understood the concepts of social psychology 6. Comprehended the social perception and cognition. 7. Studied the Socialization 8. Understood the meaning and theories attitudes
PSY 103A	a. Psychopathology-I (CF)	2020	<ol style="list-style-type: none"> 5. Understood the meaning abnormal behavior and historical and current trends 6. Comprehended the models of abnormal behaviour and approaches to therapies 7. Learned about classification and assessment of abnormal behaviour 8. Able to evaluate different approaches to therapies for

			abnormal behaviour
PSY 103B	b. Psychological Measurement-I(CF)	2020	<ol style="list-style-type: none"> 5. Understood the assessment and psychological measurements 6. Comprehended the development of psychological tests and principles of test construction. 7. Learned the Principles of Test Construction 8. Understood the test Development and test Standardization Procedures
PSY 103C	c. Positive Psychology (CF)	2020	<ol style="list-style-type: none"> 1. Understood the human strength of positive psychology 2. Acquainted students with positive subjective states and processes 3. Enabled students to appreciate importance of positive Individual Traits 4. Understood the Positive behaviour in Institutions
PSY 104A	a. Child Development Psychology	2020	<ol style="list-style-type: none"> 5. Exposed the students to the basics of Child Development 6. Helped the student understand research in child development 7. Understood the biological development of a child 8. Able to evaluated personality development of a child
PSY 104B	b. Psychological Measurement & Statistics	2020	<ol style="list-style-type: none"> 5. The students acquainted with intelligence and achievement tests 6. The students learned the measurement of personality tests 7. They are clear in understanding the Statistics for Psychological Measurement 8. They have knowledge on Distribution of Scores on Variables.

PSY 104C	c. Forensic Psychology	2020	<ol style="list-style-type: none"> 5. Exposed the student to the basics of forensic Psychology 6. Students understood the concept of psychology of Crime 7. They acquainted knowledge on psychological investigation of Crime 8. Students understood psychology of violence of various forms.
PSY 201	General Psychology - II (CC)	2020	<ol style="list-style-type: none"> 1. The students understood the fundamentals of motivation and emotion 2. They understood the basic concepts of memory and forgetting 3. Comprehended the thinking and intelligence 4. Able to evaluated the personality of individuals
PSY 202	Applied Social Psychology-(CC)	2020	<ol style="list-style-type: none"> 1. Students understood about Social Influence 2. Acquainted with social exchange process in social behaviour. 3. Comprehended the prejudice and discrimination 4. To understand what is psychological groups and individuals.
PSY 203A	a. Psychopathology-II(CF)	2020	<ol style="list-style-type: none"> 1. Understood anxiety and mood disorders 2. Acquainted with somatic disorders. 3. Studied Psychosis and Cognitive Disorders 4. Understood Psychological Disorders Across the Life Span

PSY 203B	b. Psycho-Diagnosis (CF)	2020	<ol style="list-style-type: none"> 1. Acquired the knowledge of psychological tests and their use in diagnosis. 2. Students are able to diagnose patients with the help of projective tests. 3. Understood of different diagnostic systems. 4. Learned how to take case history of patients and to make differential diagnosis
PSY 203C	c. Computer Application in Psychological Research-(CF)	2020	<ol style="list-style-type: none"> 1. Understood the basic components of computer 2. Acquainted with Ms Office, power point and internet services. 3. Comprehended the application of computer knowledge through creating emails, scientific journals and data scoring 4. Able to understand Statistical Packages and its application
PSY 204A	a. Life Span Development Psychology : Infancy to Adolescence (Prenatal to Adolescents)	2020	<ol style="list-style-type: none"> 1. To understood human development 2. The students became aware of infancy and babyhood 3. To comprehended the Early and Late Childhood and Adolescence. 4. The students are aware of the development of Adolescence
PSY 204B	b. Consumer Behavior	2020	<ol style="list-style-type: none"> 1. The students understood the concept of consumer behaviour and market research 2. Comprehended the economic theory of buyer

			<p>behaviour</p> <ol style="list-style-type: none"> 3. Studied the effect of psychological theories of motives 4. Acquainted with the advertisement - advertisement purposes-role of communication
PSY 204C	c. Industrial & Organizational Psychology	2020	<ol style="list-style-type: none"> 1. Understood the psychological, social and economic contribution in developing industrial psychology. 2. Comprehended the personal psychology 3. Have knowledge the selection, interviews and evaluation. 4. Comprehended the employment interview
CPSY 301	Counseling Process	2020	<ol style="list-style-type: none"> 1. Understood the counseling as helping profession 2. To acquire the relation with other helping professions 3. To know the legal and ethical issues 4. Developed the importance of verbal and non verbal skills in counseling sessions.
CPSY 302	Counseling Skills	2020	<ol style="list-style-type: none"> 1. Understood the micro-skills of counselling through a series of practices. 2. Got an idea about who to understand the people and interpret their feelings with positive appreciation 3. To provide a space where participants can grow, in the sense of allowing an encounter with them first and based on this encounter to achieve a better

			<p>understanding of how they impact on other people.</p> <p>4. The ability to examine and assess the clients with scientific manner.</p>
CPSY 303A	a. Therapeutic Approaches in Counseling-I	2020	<ol style="list-style-type: none"> 1. Understood the various Therapeutic Approaches of counseling. 2. Understood the techniques relevant to therapies. 3. To acquires the basic procedures. 4. Learned how to touch in the insight of the client
CPSY 303B	b. Counseling in Organizational Settings	2020	<ol style="list-style-type: none"> 1. Understood the basic Principles of Organizational behaviour 2. Acquired the role of counselor at work place and identified the causes and problems in work environment 3. To adopted the leadership styles to lead the employees. 4. Enhanced the adjustment and commitment styles in work environment.
CPSY 303C	c. Health Psychology (GE)	2020	<ol style="list-style-type: none"> 1. Understood the concept of the Health psychology 2. Acquainted with and health behaviour. 3. Comprehended the health behaviour enhancement and management 4. Realized the future of the health psychology.
CPSY 305	Stress Management & Counseling Psychology Theory & Practical	2020	<ol style="list-style-type: none"> 1. Understood the stress and coping styles 2. Acquired the sources of stress 3. Learned the techniques of stress management 4. To comprehend the implementation of stress management

			and counseling techniques
CPSY 306	Personality Development	2020	<ol style="list-style-type: none"> 1. Studied biological, psychological determinants 2. The students aware of socio cultural determinants & Soft Skills 3. The students acquainted with soft skills 4. They learned more on Soft skills
CPSY401	Applications of Counseling in Special Areas	2020	<ol style="list-style-type: none"> 1. Understood how to handle the client with various problems and hailing into different age groups. 2. Learned how to handle the clients with specific problems 3. To attained what is career, personal, vocational and other applied areas of counseling 4. Gained how to organize Counseling programs to handle special concerns in Different social settings.
CPSY402	Therapeutic Approaches in Counseling–II(CC)	2020	<ol style="list-style-type: none"> 1. Understood the therapeutic approaches of counseling 2. Improve the major skills in therapeutic techniques 3. Gained specific methods involved in therapy 4. Adopted the different psycho therapeutic models of counseling.
CPSY403 A	a. Counseling in Hospital Settings	2020	<ol style="list-style-type: none"> 1. Understood the concepts of Health Psychology in clinical setup. 2. Acquired the causes of Illness and Psychological Factors

			<ol style="list-style-type: none"> 3. Got a clinical picture about the role and scope of a Counselor in Hospital Settings 4. Learned the importance of Verbal and Non-verbal Communication in Patient care
CPSY403B	b. Counseling in Community Settings	2020	<ol style="list-style-type: none"> 1. Studied about the basics of Community Psychology 2. To comprehend the research methods to collect and analyze the data . 3. Understood the role of supporting agencies to promote community guidance 4. Adopted different rehabilitation practices
CPSY403C	c. Counseling the Family	2020	<ol style="list-style-type: none"> 1. Understand the need and importance of family counseling. 2. Improved how to handle the family issues 3. To maximized use of tools in counseling 4. Learned the specific skills to handle family issues.
CPSY406	Life Skills (OE)	2020	<ol style="list-style-type: none"> 1. Learned the concept of life skills and its importance in relation to personality development of an individual. 2. They became aware of the components of life skills and the method of imparting knowledge of life skills. 3. The students have learned more on Life Skills in Specific 4. They acquainted with Self management skills

42. Statistics

Course Code	Title of the Course	Years of Introduction	Course Outcomes
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ST - 101	Linear Algebra	2020	<ol style="list-style-type: none"> 1. Students understood for estimation of elementary transformations in matrix and their solutions. 2. Students learnt about characteristic roots and vectors with numerical examples. They also know theoretical proofs of theorems. 3. Discriminate between diagonalizable and non-diagonalizable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms 4. Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in specific bases
ST - 102	Probability and Distributions	2020	<ol style="list-style-type: none"> 1. Students must have knowledge about random variables, expectations, sets and their properties and inequalities where ever necessary. 2. Students also know the weak law, strong law and central limit theorem and their importance 3. Students know about different continuous and discrete distributions and their properties. 4. They have awareness about central and non-central sampling distributions and order Statistics. Idea about simple, partial and multiple correlation coefficients.
ST – 103A	a. Sampling Techniques	2020	<ol style="list-style-type: none"> 1. Students learnt different sampling techniques of with replacement/ without replacement and Different sampling models. 2. Students studied non-Sampling errors and different remedies.

			<ol style="list-style-type: none"> 3. Implement Cluster sampling, Ratio and Regression estimation in real life problems 4. Apply unequal probability sampling designs viz. PPSWR, PPSWOR including Lahiri's method and Murthy's estimator for survey.
ST – 103B	b. Stochastic Process	2020	<ol style="list-style-type: none"> 1. Students understoodstochastic processes, Markov chains, Poisson process, Renewal theory, Branching process, etc. 2. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. 3. Understand the consequences of the Intermediate value theorem for continuous function. 4. Know the chain rule and use it to find derivatives of composite functions and obtain expression for higher order derivatives of a function using the rule of differentiation. Solve integrals and evaluation of multiple integrals with numerical problems.
ST – 104A	Statistical 483analysis using excel and SPSS	2020	<ol style="list-style-type: none"> 1. Students can learn how to enter the data MS-Excel. 2. Students can analyze the data in Excel and SPSS. 3. Students can learn how to transfer the data in one data Analysis application to Another. 4. Students can predict the future data using SPSS Procedures.
ST-104B	Python	2020	<ol style="list-style-type: none"> 1. Students have done Python Programming and their Object and Classes. 2. Students have understood I/O and Error Handling in Python. 3. Students can understand the looping problems. 4. Students can do basic EDA.

ST - 106	Practical-II (75 Practical + 25 Record)	2020	<ol style="list-style-type: none"> 1. Numerical problems related to Probability and Distribution Theory, are solved by executing programs on computers. 2. Calculate probabilities relevant to multivariate distributions, including marginal and conditional probabilities and the covariance of two random variables 3. Perform inferential statistical analysis through SPSS. 4. Compute descriptive statistics using SPSS.
ST - 201	Statistical Inference	2020	<ol style="list-style-type: none"> 1. Students know about point estimation, non-parametric models, Game theory, theorems and Proofs where ever necessary. 2. They can understand the concept of random sample from a distribution,sampling distribution of statistic,standard error of important estimates such as mean and proportions. 3. Students may gain the knowledge of testing of hypotheses (both large sample test and small sample test). 4. They can also calculate the problems related to point estimation and interval estimation.
ST - 202	Multivariate Analysis	2020	<ol style="list-style-type: none"> 1. Students learnt about importance of multivariate variables and their distributions 2. T^2, D^2, MANOVA models are understood and know it's importance. 3. Implement dimension reduction techniques using software on real life problems. 4. Classification analysis methods explained according to their classification algorithm.
	(a) Linear Models and	2020	<ol style="list-style-type: none"> 1. Students learnt about different linear and non-linear regression models and their appropriate computational

ST - 203	Applied Regression Analysis (b) Demography and Official Statistics		<p>procedures.</p> <ol style="list-style-type: none"> 2. They know R^2, adjusted R^2 and C_p criteria for model selection. 3. They will get the knowledge of building and fitting linear regression models with software. 4. They also learn about the theory underlying point estimation, hypothesis and confidence intervals for linear regression models.
ST – 204 A	Design and Analysis of Experiments	2020	<ol style="list-style-type: none"> 1. Students learnt ANOVA, ANCOVA technique for one way and two-way classifications. Multiple comparisons tests using Tukey's, Duncans, Sheffe's and Dunnet's tests. 2. Students understood about Latin squares and their construction, missing plot technique etc. 3. Students explained about Incomplete Block Designs and their analysis, etc. 4. Understand the basic terms used in design of experiments by using appropriate experimental methods.
ST - 301	Econometric Methods	2020	<ol style="list-style-type: none"> 1. Students learnt heteroscedasticity, multicollinearity and autocorrelation and their estimation procedures. 2. Students understood about different lag models and simultaneous linear equations model with their estimation methods. 3. Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model. 4. Understand the assumptions upon which different econometric methods are based and their implications.

ST - 302	Operations Research-I	2020	<ol style="list-style-type: none"> 1. Students understood about Dual primal, Revised simplex methods. 2. Students learnt non-linear programming, integer programming, CPM, PERT, different models of games. 3. Students can think the real-life problems in the way of Linear Programming Problems and try to solve the problems in Mathematical Way. 4. Students can take a decision in real life by Using the Game Theory Techniques.
ST - 303	Biostatistics	2020	<ol style="list-style-type: none"> 1. Students learnt about biological assay, their distribution and theorems, dose response relationships, basic concepts of biological assay, estimation methods of gene frequencies, etc. 2. Describe single and multi-species population growth models. 3. Apply the concept of deterministic and stochastic models on simple and general epidemics. Understand linearization of dynamical systems with various dimensions
ST - 305	STATISTICAL ANALYSIS USING R	2020	<ol style="list-style-type: none"> 1. Students can manipulate the vectors, matrices, arrays, data frames and lists. 2. Students can work with the character data, factor data and dates. 3. Students get the results using data in R. 4. Students can work with different distributions and apply different tests for the data using R.
	Practical-VI (75	2020	1. Students can understand the Statical Methos in Economical

ST - 305 P	Practical + 25 Record)		Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. 4. Students can understand how the statistics use in biological aspects
ST - 306 A	(a) Statistics for Biological and Earth Sciences	2020	1. Students learnt about Graphs, measures of averages, measures of dispersion etc. 2. Students understood about Basic probability and important distributions with workout examples. 3. Students used t, F, χ^2 , ANOVA and ANCOVA and non-parametric tests with examples. 4. Students used Advanced statistics tools with working illustrations.
ST - 306 B	(b) Statistics for Social and Behavioral Sciences	2020	1. Students learnt about Graphs, measures of averages, measures of dispersion etc. 2. Students understood about basic probability and important distributions with workout examples. 3. Students applied t, F, χ^2 , ANOVA and ANCOVA and non-parametric tests and discussed with examples. 4. Students used Advanced statistics tools with illustrations.
ST - 401	Time Series Analysis and Forecasting Methods	2020	1. Students understood Time series analysis with some important growth models and their fitting 2. Students forecasting using regression, non-linear regression techniques, single, double, triple and adoptive exponential smoothing models.

			<p>3. Students obtained knowledge on AR, MA, ARMA, ARIMA, models fitting, diagnostic checking, etc. Check and validate models with its residual analysis and diagnostic checking.</p>
ST - 402	Operations Research-II	2020	<ol style="list-style-type: none"> 1. To perform Dynamic programming and their applications and computation procedure with illustration. 2. To discuss different Queuing models steady state solutions with examples. 3. To explain Inventory models with and without shortages, S-splicy, EOQ estimation with simple examples 4. To understand Replacement problems such as block and age replacement problems, individual and group replacement policies with examples.
ST – 403A	Advanced Econometric models	2020	<ol style="list-style-type: none"> 1. Students understood GLM, SURE, nested and non-nested statistical models. 2. Students learnt about specification error, adding, switching models. 3. Students performed probit, logit models and their estimation. Students can understand the qualitative and limited dependent variable models.
ST-403B	Total Quality Management & Six sigma	2020	<ol style="list-style-type: none"> 1. Students learn the Quality management importance in real life. 2. Students directly know the organizing and planning for the Quality development. 3. Students can understand the process managment and leadership to empower the teamwork. 4. Students know the tools of quality management and their

			usage
ST-404 P	Practicals-VII	2020	<ol style="list-style-type: none"> 1. Students solved Numerical problems related to semester – IV theory papers. 2. Students can understand how the statistics can play the role in the prediction of the future data. 3. Students can do the future predictions by using the existing data. 4. Students can do the research on the statistical data.
ST - 405	Student Project: Data Centre / Institutions / Companies and etc.,	2020	<ol style="list-style-type: none"> 1. Students collected data in different ways. 2. Students can prepare different questioner for collection of the data. 3. Students can learn data entry in particular software, analysis and interpretation. 4. Students learn and prepare the details reports on the projects.
ST - 406 A	(a) Business Analytics	2020	<ol style="list-style-type: none"> 1. Students learnt Graphs, measures of averages, measures of dispersion etc. 2. Students studied basic probability and important distributions with workout examples. 3. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests and discussed with examples. 4. Students performed advanced statistics tools for solving the problems.
ST-406B	(b) Survival Analysis	2020	<ol style="list-style-type: none"> 1. Students learnt about survival functions, their estimating methods, Distributions and their comparison for survival distributions. 2. Understand the elements of reliability, hazard function and its applications.

			<ol style="list-style-type: none"> 3. Understand the concept of censoring, life distributions and ageing classes. 4. Estimate nonparametric survival function of the data.
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Applied Statistics

Course Code	Title of the Course	Years of Introduction	Course Outcomes
APST - 101	Linear Algebra	2020	<ol style="list-style-type: none"> 5. Students understood for estimation of elementary transformations in matrix and their solutions. 6. Students learnt about characteristic roots and vectors with numerical examples. They also know theoretical proofs of theorems. 7. Discriminate between diagonalizable and non-diagonalizable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms 8. Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in specific bases
APST - 102	Probability and Distributions	2020	<ol style="list-style-type: none"> 5. Students must have knowledge about random variables, expectations, sets and their properties and inequalities where ever necessary. 6. Students also know the weak law, strong law and central limit theorem and their importance 7. Students know about different continuous and discrete distributions and their properties.

			8. They have awareness about central and non-central sampling distributions and order Statistics. Idea about simple, partial and multiple correlation coefficients.
APST – 103A	a. Sampling Techniques	2020	<p>5. Students learnt different sampling techniques of with replacement/ without replacement and Different sampling models.</p> <p>6. Students studied non-Sampling errors and different remedies.</p> <p>7. Implement Cluster sampling, Ratio and Regression estimation in real life problems</p> <p>8. Apply unequal probability sampling designs viz. PPSWR, PPSWOR including Lahiri's method and Murthy's estimator for survey.</p>
APST – 103B	b. Stochastic Process	2020	<p>5. Students understoodstochastic processes, Markov chains, Poisson process, Renewal theory, Branching process, etc.</p> <p>6. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations.</p> <p>7. Understand the consequences of the Intermediate value theorem for continuous function.</p> <p>8. Know the chain rule and use it to find derivatives of composite functions and obtain expression for higher order derivatives of a function using the rule of differentiation. Solve integrals and evaluation of multiple integrals with numerical problems.</p>
APST – 104A	Statistical 491analysis using excel and SPSS	2020	<p>5. Students can learn how to enter the data MS-Excel.</p> <p>6. Students can analyze the data in Excel and SPSS.</p> <p>7. Students can learn how to transfer the data in one data Analysis application to Another.</p> <p>8. Students can predict the future data using SPSS</p>

			Procedures.
APST-104B	Python	2020	<ol style="list-style-type: none"> 5. Students have done Python Programming and their Object and Classes. 6. Students have understood I/O and Error Handling in Python. 7. Students can understand the looping problems. 8. Students can do basic EDA.
APST - 106	Practical-II (75 Practical + 25 Record)	2020	<ol style="list-style-type: none"> 5. Numerical problems related to Probability and Distribution Theory, are solved by executing programs on computers. 6. Calculate probabilities relevant to multivariate distributions, including marginal and conditional probabilities and the covariance of two random variables 7. Perform inferential statistical analysis through SPSS. 8. Compute descriptive statistics using SPSS.
APST - 201	Statistical Inference	2020	<ol style="list-style-type: none"> 5. Students know about point estimation, non-parametric models, Game theory, theorems and Proofs where ever necessary. 6. They can understand the concept of random sample from a distribution,sampling distribution of statistic,standard error of important estimates such as mean and proportions. 7. Students may gain the knowledge of testing of hypotheses (both large sample test and small sample test). 8. They can also calculate the problems related to point estimation and interval estimation.
APST - 202	Multivariate Analysis	2020	<ol style="list-style-type: none"> 5. Students learnt about importance of multivariate variables and their distributions

			<ol style="list-style-type: none"> 6. T^2, D^2, MANOVA models are understood and know it's importance. 7. Implement dimension reduction techniques using software on real life problems. 8. Classification analysis methods explained according to their classification algorithm.
APST - 203	(a) Linear Models and Applied Regression Analysis (b) Demography and Official Statistics	2020	<ol style="list-style-type: none"> 5. Students learnt about different linear and non-linear regression models and their appropriate computational procedures. 6. They know R^2, adjusted R^2 and C_p criteria for model selection. 7. They will get the knowledge of building and fitting linear regression models with software. 8. They also learn about the theory underlying point estimation, hypothesis and confidence intervals for linear regression models.
APST – 204 A	Design and Analysis of Experiments	2020	<ol style="list-style-type: none"> 5. Students learnt ANOVA, ANCOVA technique for one way and two-way classifications. Multiple comparisons tests using Tukey's, Duncans, Sheffe's and Dunnet's tests. 6. Students understood about Latin squares and their construction, missing plot technique etc. 7. Students explained about Incomplete Block Designs and their analysis, etc. 8. Understand the basic terms used in design of experiments by using appropriate experimental methods.
APST - 301	Applied Econometrics	2020	<ol style="list-style-type: none"> 1. Students learnt heteroscedasticity, multicollinearity and autocorrelation and their estimation procedures. 2. Students understood about different lag models and

			<p>simultaneous linear equations model with their estimation methods.</p> <ol style="list-style-type: none"> 3. Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model. 4. Understand the assumptions upon which different econometric methods are based and their implications.
APST - 302	Applied Operations Research	2020	<ol style="list-style-type: none"> 1. Students understood about Dual primal, Revised simplex methods. 2. Students learnt non-linear programming, integer programming, CPM, PERT, different models of games. 3. Students can think the real-life problems in the way of Linear Programming Problems and try to solve the problems in Mathematical Way. Students can take a decision in real life by Using the Game Theory Techniques.
APST – 303	Practical- V (75 Practical +25 Record)	2020	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. 4. Students can understand how the statistics use in biological aspects.
APST - 304	Advanced Bio-Statistics	2020	<ol style="list-style-type: none"> 1. Students learnt about biological assay, their distribution and theorems, dose response relationships, basic concepts of biological assay, estimation methods of gene frequencies, etc.

			<ol style="list-style-type: none"> 2. Describe single and multi-species population growth models. 3. Apply the concept of deterministic and stochastic models on simple and general epidemics. 4. Understand linearization of dynamical systems with various dimensions.
APST - 305	Practical-VI (75 Practical + 25 Record)	2020	<ol style="list-style-type: none"> 1. Students can manipulate the vectors, matrices, arrays, data frames and lists. 2. Students can work with the character data, factor data and dates. 3. Students get the results using data in R. 4. Students can work with different distributions and apply different tests for the data using R.
APST - 306	(a) Statistics for Biological and Earth Sciences (b) Statistics for Social and Behavioral Sciences	2020	<p>A. Statistics for Biological and Earth Sciences</p> <ol style="list-style-type: none"> 1. Students learnt about Graphs, measures of averages, measures of dispersion etc. 2. Students studied Basic probability and important distributions with workout examples. 3. Students performed t, F, χ^2, ANOVA and ANCOVA and non-parametric tests with examples. 4. Students studied Advanced statistics tools with illustrations. <p>B. Statistics for Social and Behavioral Sciences</p> <ol style="list-style-type: none"> 1. Students learnt Graphs, measures of averages, measures of

			<p>dispersion etc.</p> <ol style="list-style-type: none"> Students understood about Basic probability and important distributions and studied with workout examples. Students performed t, F, χ^2, ANOVA and ANCOVA and non-parametric tests and discussed with examples. Students learnt about Advanced statistics tools with working illustration
APST - 401	Applied Forecasting Methods	2020	<ol style="list-style-type: none"> Students understood Time series analysis with some important growth models and their fitting Students forecasting using regression, non-linear regression techniques, single, double, triple and adoptive exponential smoothing models. Students obtained knowledge on AR, MA, ARMA, ARIMA, models fitting, diagnostic checking, etc. Check and validate models with its residual analysis and diagnostic checking.
APST - 402	Reliability and Survival Analysis	2020	<ol style="list-style-type: none"> Students learnt about and survival analysis with their related distributions, relationships, non-parametric methods for computing survival analysis. Estimate nonparametric survival function of the data. Explain test of exponentiality against nonparametric classes, two sample problems. Understand the elements of reliability, hazard function and its applications.
APST – 403A	Statistics for research, industry and Community development	2020	<ol style="list-style-type: none"> Students have done Simulation models, response surface models, demand analysis, social survey and their related measures. Students can understand the basic of research blooms

			<p>taxonomy of learning levels.</p> <ol style="list-style-type: none"> Find the topic from current research in statistics education. Students can apply the tools in design, research and developments.
APST-403B	Advanced econometric models	2020	<ol style="list-style-type: none"> Students understood GLM, SURE, nested and non-nested statistical models. Students learnt about specification error, adding, switching models. Students performed Probit, logit models and their estimation. Students can identify qualitative and limited dependent variable models
APST – 404	Practical-VII	2020	<ol style="list-style-type: none"> Students solved Numerical problems related to semester –IV theory papers. Students can understand how the statistics can play the role in the prediction of the future data. Students can do the future predictions by using the existing data. <p>Students can do the research on the statistical data.</p>
APST - 405 A	Student Project: Data Centre / Institutions / Companies and etc.,	2020	<ol style="list-style-type: none"> Students collected data in different ways. Students can prepare different questioner for collection of the data. Students can learn data entry in particular software, analysis and interpretation. Students learn and prepare the details reports on the projects.
APST-	Statistical Quality	2020	<ol style="list-style-type: none"> Students with their knowledge in control charts.

405B	Control		<ol style="list-style-type: none"> 2. Students with their knowledge in Concept of Six sigma and its relationship with process capability. 3. Student have awareness about OC and ARL of Shewart's control charts Students have awareness about Total Quality Management.
APST - 406 A	(a) Statistics for Marketing Research	2020	<ol style="list-style-type: none"> 1. Students learnt about Research design and how to frame questionnaire etc. 2. Statistics relating to research like univariate test like Z, t, F, ANOVA, CRD, RBD and LSD are done. 3. Multivariate statistical techniques like factor analysis, dissemination analysis and cluster analysis are used. 4. Students can understand how the marketing is happening in the real life.
APST - 406 B	(b) Statistical Analysis Using SPSS	2020	<ol style="list-style-type: none"> 1. Able to create and manipulate vectors, matrices, arrays, data frames and lists. 2. Should be able to work with character data, factor data and dates. 3. Able to write scripts and function in R and read data from .csv files, EXCEL files and SPSS files. <p>Able to use built-in functions to answer questions relating to probability distributions, parametric and non-parametric hypothesis testing, correlation and regression analysis, and one-way and two-way ANOVA</p>

43. Virology

S . N o .	Co urs e Co de	Title of the Course	Years of Intro duction	Activities/Content with direct bearing on Employability/Entrepreneurship /Skill development
1	VR- 101	Biological Chemistry	2020	<p>Acquire knowledge on major elements and biomolecules of life and their characteristics.</p> <p>CO2: Learn the classification, structure, properties and functions of carbohydrates, lipids, proteins, classification and properties of enzymes and enzyme kinetics</p> <p>CO3: Explain the types, structure and functions of nucleic acids, hormones, growth regulators and vitamins.</p> <p>CO4: Learn the concepts of bioenergetics and biosynthesis of carbohydrate, lipid, carbohydrates, and proteins. .</p>
2	VR- 102	Analytical Techniques	2020	<ol style="list-style-type: none"> 1. To understand the approaches involved in characterization and concentration of biomolecules and to train students in adopting various techniques involved in biological research such as microscopic, 2. To understand the approaches involved in chromatographic, centrifugal, and electrophoretic techniques. 3. To learn about various radioisotopes, spectroscopy and cell counting techniques that are used for characterization of biomolecules and 4. To learn about basic concepts of biostatistics such as measures of central tendency and dispersion, correlation and regression analysis, probability distribution and tests of significance.

3	VR-103	Biological Chemistry and Analytical Techniques	2020	<p>Learn to calculate normality, molarity, molecular weight and percentage of chemical substances and qualitative and quantitative estimation of major biomolecules such as proteins, carbohydrates, lipids and nucleic acids.</p> <p>Knowhowto isolate and check the activity of enzymes from various sources.</p> <p>Learn to useultrafiltration, chromatography, and electrophoresis techniquesfor isolation and characterization of biomolecules.</p> <p>Acquire the skills to usespectroscopic and centrifugal methods for characterization of biomolecules.</p>
4	VR-104	General Microbiology and Virology	2020	<p>Define laboratory safety measures that needs to be followed in Virology and Microbiology laboratories and know how to use different sterilization methods and preparation of media.</p> <p>Acquire the practical skills to usecultivation, staining and characterization methods for different microorganisms and to check their stability under various conditions.</p> <p>Learn to isolate bacteriophages from different sources and cultivate viruses in embryonated eggs and plants.</p> <p>Demonstrate the mechanical, aphid and graft transmission of plant viruses and methods used to check the stability of viruses and determine the effect of virus infection on plants through chlorophyll estimation.</p> <p>-</p>

5	VR-105	General Microbiology and Virology	2020	<ol style="list-style-type: none"> 1. To acquire the knowledge on origin, evolution, and importance of microorganisms, microbial taxonomy, morphology, and structure of bacteria and 2. To learn cultivation, control strategies of microorganisms and to learn about important microbial diseases and host pathogen interactions. 3. To understand the physical, biochemical, biological, and molecular properties of viruses and 4. To learn isolation, cultivation and purification methods used for viruses, biology of bacteriophages and subviral agents.
6	VR-106	Human values and Professional ethics - I	2020	<p>To enable the students to imbibe and internalize the moral values and ethical principles</p> <ol style="list-style-type: none"> 2. To learn ethics moral and social values and ethical behavior in the personal and Professional lives. 3. To learn the rights and responsibilities and to appreciate the rights of others and to create awareness on religious values and other good acts and facts of life. 4. To acquire knowledge about the important facts of Bhagavad Gita, values hidden in religions, religious tolerance and aware of crime, and punishment theories
8	VR-201	Cell and Molecular Biology	2020	<ol style="list-style-type: none"> 1. To gain understanding of structural and functional organization of prokaryotic and eukaryotic cells, types of cell division and their regulation, cell communication and signaling 2. To discuss Mendelian laws, prokaryotic and eukaryotic genome organization, extrachromosomal elements and gene transfer and mapping mechanisms in bacteria. 3. To attain knowledge about the processes involved in central dogma

				<p>viz. replication, transcription, reverse transcription and translation, mechanisms of DNA damage and repair</p> <p>4. To learn regulation of gene expression, mutations, and gene silencing mechanisms</p>
9	VR-202	Recombinant DNA Technology	2020	<p>To learn the scope, importance of genetic engineering, basic steps of gene cloning and the role of enzymes, vectors, oligonucleotides, and hosts in gene manipulation.</p> <p>2.To learn basic and advanced tools and techniques, approaches and strategies used in gene manipulation in prokaryotic and eukaryotic systems</p> <p>3. To learn the gene cloning strategies and learn the concepts and applications of genomics, proteomics, transcriptomics, and introduction to metagenomics, viromics.</p> <p>4. To understand the strategies used for gene expression in heterologous hosts and applications/implications of genetic engineering in agriculture, medicine, industry and biology.</p>
10	VR-203	Cell and Molecular Biology & Recombinant DNA Technology	2020	<p>Learn the safety practices and precautions to be followed in setting up molecular biology laboratory with ribonuclease free environment.</p> <p>Isolate cells, DNA and RNA from plant and animal tissues, demonstrate mitosis, plasmid curing, replica plate and gradient plate methods.</p> <p>Acquire practical skills to isolate plasmids, restriction enzyme digestion of DNA, recovery of DNA from gels, transformation of bacteria and demonstrate the southern and dot blot preparation for hybridization.</p>

				Solve the problems related to molecular biology and recombinant DNA technology and learn the basic bioinformatic tools that are important for DNA analysis.
1 1	VR- 204	Immunology	2020	<ul style="list-style-type: none"> - Illustrate basic immunology techniques such as counting of RBC and WBC, estimation of hemoglobin, identification of the blood groups and Rh. - CO2:Identify of primary and secondary lymphoid organs in virtual animal model - Demonstrate antigen-antibody interactions by conducting <i>in vitro</i> serological tests such as immunodiffusion and immune electrophoresis. - Conduct DAC-ELISA, Dot-ELISA, and western blotting to identify important pathogens based on antigen-antibody interactions. Apply the practical oriented knowledge to foster employability in private industries, higher education in premier institutes.
1 2	VR- 205	Immunology	2020	<ul style="list-style-type: none"> - Discuss the history of immunology, types of immunity, cells and organs of immune system and types and properties of antigens. - Understand the types, structure and biological activities of antibodies, concepts of <i>in vivo</i> and <i>in vitro</i> antigen-antibody interactions and discuss the properties and functions of cytokines, Toll-like receptors and complement components and activation

				<p>pathways</p> <ul style="list-style-type: none"> - Describe the induction and mechanism of humoral and cell mediated immune responses, interaction between innate and adaptive immune responses through MHCs and antigen presentations and hypersensitivity reactions. - Learn about the basis of autoimmune and immunodeficiency disorders, basic of transplantation and cancer immunology, concepts, and applications of conventional and modern vaccines.
1 3	VR- 206	Human values and Professional ethics - II	- 20 20	<ul style="list-style-type: none"> - Understand the definition of value education, concept of human and family values, components, structure, and responsibilities of family system and acquire reflective thinking, rational skepticism. - Describe the moral responsibilities and ethical issues of medical and health care professionals, avoid unethical things, learn ethical issues raised in genetic engineering and new biological technologies. - Learn to practice ethical standards in business by understanding ethical theories and maintain work ethics to build trust between businessman and consumer and avoid unethical behavior and ethical abuse and develop scientific temper, digital literacy. - Learn to practice environmental ethics by taking responsibility to protect environment and ecosystem and understand the importance of maintenance of social ethics and ethics of media.

1 4	VR - 30 1	Plant Virology	2020	<p>Understand the induction of plant virus diseases, virus-host interactions and movement strategies.</p> <p>Learn the vector and non-vector modes of plant virus transmission, virus-vector relationships and molecular mechanisms involved in virus vector interactions and the approaches used for identification and characterization of the viruses and virus strains.</p> <p>Acquire the knowledge on plant virus spread and survival in nature and approaches used to detect plant viruses and diseases.</p> <p>Describe the approaches used for the control and management of plant viruses and vectors and strategies used for acquiring plant virus resistance.</p>
1 5	VR - 30 2	Plant Viruses and Diseases	2020	<p>Describe the incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the major virus diseases of cereals, millets and oil seed crops.</p> <p>Learn the incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the major virus diseases of vegetable and tuber crops.</p> <p>Acquire the knowledge of incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the major virus diseases of food legume and fruit crops.</p> <p>Discuss the incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the major virus diseases of cash, spice, beverage, flowering and foliage ornamental crops</p>

1 6	VR - 30 3	Plant Virology and Plant Virus Diseases	2020	<ul style="list-style-type: none"> - Identify major virus diseases of local economically important crop plants and weeds through theory exercises, local field surveys, agricultural research station visits. - Determine and compare the effect of virus on cell size, chloroplast number, total carbohydrates, proteins, and lipids with healthy counterparts. - Detect unknown viruses through ELISA and PCR (theory exercise and practical) and demonstrate plant virus transmission by seed and vegetative propagules. - Identify local plant virus vectors, determine virus disease incidence and progress curves through local field visits. <p>v.</p>
1 7	VR - 30 4	a) Molecular Virology (OR) b) Tumor Virology	2020	<p>Acquire skills to detect carcinogens and mutagens using standard tests such as Ames test.</p> <p>Distinguish transformed and normal cell lines and determine the anticancer property of biologically active compounds.</p> <p>Design and execute PCR and other point of care methods using commercial kits for detection of tumor viruses (HCV, HIV).</p> <p>Perform cultivation of poultry tumor viruses in cell cultures and acquiring the knowledge on histopathology of animal tumor viruses.</p>
1 8	VR - 30 5	(a) Molecular Virology	2020	<ul style="list-style-type: none"> - Acquire the skills to use the techniques involving purification of viruses such as maintenance of virus cultures on propagation hosts, clarification using organic solvents and low speed centrifugation, precipitation using sodium chloride or ammonium sulphate or

		(OR)	<p>polyethylene glycol or differential centrifugation, preparation of step and linear density gradients, further purification of viruses using sucrose density gradient centrifugation and final pelleting by ultrafiltration or ultracentrifugation and to check the quality and quantity of viruses using spectroscopy or transmission electron microscopy.</p> <ul style="list-style-type: none"> - Isolate virus coat proteins and determine its size and molecular weight through SDS-PAGE. - Isolate virus nucleic acids (dsRNA, RNA and DNA) and determine its size and molecular weight through agarose gel electrophoresis. - Determine the stability of virus by studying effect of physical and chemical agents on virus inactivation.
		(b) Tumor Virology	<ul style="list-style-type: none"> - Acquire knowledge about principles of virus architecture and effect of physical and chemical agents on viruses. - Learn about structure and diversity of viral genomes, general concepts of replication of viruses and expression and replication of DNA viruses - Learn about expression and replication of different RNA viruses and subviral agents such as viroids, Satellite viruses, defective interfering particles and prions. - Describe the regulation of viral genome expression and concepts/molecular mechanisms of transformation of cells by tumor viruses and therapeutic interventions and oncolytic viruses

19	VR - 306	(a) Veterinary and agricultural Viruses and their management (OR)	2020	<ul style="list-style-type: none"> - Describe the origin, evolution, morphology and properties of viruses, cultivation, and transmission of viruses. - Understand the history, structure, transmission, epidemiology, detection and control of important animal viruses and concepts of veterinary epidemiology. - Learn about history, structure, transmission, epidemiology, detection, and control of major viruses infecting plants and humans. - Acquire knowledge about biological, physical, serological, and molecular methods used for detection of viruses and describe strategies followed for management of plant and animal viruses.
		(b) Emerging Infectious Virus Diseases		<ul style="list-style-type: none"> - Understand the evolution, general introduction to morphology, cultivation, and transmission of viruses. - Describe the epidemiology and surveillance of emerging infectious and zoonotic viral diseases. - List and discuss the important vector-borne and non-vector-borne emerging virus diseases. - Learn about virus surveillance, surveys and strategies of prevention and control of emerging viruses and bioterrorism.
20	VR - 40	Animal and Human Virology	2020	Understand the virus host interactions, host defense mechanisms against viruses and innate and adaptive immune responses to viruses.

	1			<p>Describe the various modes of vertical and horizontal transmission of animal and human viruses, zoonotic virus infections, routes of entry and mechanism of virus spread in the body.</p> <p>Learn about the epidemiological concepts of virus diseases, measures of disease occurrence, prevalence, and mapping, determinants of disease, factors affecting virus ecology and epidemiology and biological, serological, and molecular approaches used for detection of animal and human viruses.</p> <p>Acquire knowledge on virus disease surveillance, strategies of virus maintenance in communities, principles of virus disease survey, methods of prevention and control of animal and human viruses.</p> <p>-</p>
2 1	VR - 40 2	Animal and Human Virus Diseases	2020	<ul style="list-style-type: none"> - Acquire the knowledge about etiology, transmission, clinical manifestations, diagnosis, prevention, and control of major RNA viruses of <i>Picornaviridae</i>, <i>Caliciviridae</i>, <i>Coronaviridae</i>, <i>Astroviridae</i>, <i>Matonaviridae</i>, <i>Togaviridae</i>, <i>Flaviridae</i>, <i>Reoviridae</i> and <i>Birnaviridae</i>. - Learn the etiology, transmission, clinical manifestations, diagnosis, prevention, and control of important RNA viruses of <i>Orthomyxoviridae</i>, <i>Paramyxoviridae</i>, <i>Rhabdoviridae</i>, <i>Filoviridae</i>, <i>Bunyaviridae</i>, <i>Arenaviridae</i> and <i>Retroviridae</i>. - Describe the etiology, transmission, clinical manifestations, diagnosis, prevention, and control of important DNA viruses of <i>Circoviridae</i>, <i>Parvoviridae</i>, <i>Poxviridae</i>, <i>Herpesviridae</i>,

				<p><i>Papillomaviridae</i> and <i>Adenoviridae</i>.</p> <ul style="list-style-type: none"> - Develop the knowledge about etiology, transmission, clinical manifestations, diagnosis, prevention, and control of important DNA viruses belonging to <i>Hepadnaviridae</i>, <i>Asfaviridae</i>, <i>Iridoviridae</i>, <i>Polydnaviridae</i> and <i>polyomaviridae</i> and understand the prion diseases, biology, prevention, and management of major viruses of silkworm, poultry, fish and prawn, emerging and reemerging virus diseases.
2 2	VR - 40 3	Animal and Human Virology & Virus Diseases	2020	<ul style="list-style-type: none"> - Understand the biosafety, biosecurity and ethical guidelines to be followed in the molecular virology laboratory. - Learn the technologies related to preparation of media for cell/tissue cultures, preparation of cell cultures/embryonated eggs for virus cultivation and isolation and quantitation of viruses using differential centrifugation and symptomatology/spectroscopy, respectively. - Develop skills to test the animal, human and plant viruses using serological and molecular tests and kit-based methods. - Acquire knowledge on virus-based nanotechnology protocols, virus epidemiology by doing extension activities and visiting field, poultry, agriculture research station and aqua forms.
2 3	VR - 40 4	(a) Applied Virology (OR)	2020	<ul style="list-style-type: none"> - Acquire the skills to prepare the cell cultures and embryonated eggs for cultivation of plant, animal and human viruses and to isolate and quantitate viruses. - Learn the methods to detect plant and animal viruses and able to

				<p>analyze various types of results obtained from serological and molecular viral diagnostic methods.</p> <ul style="list-style-type: none"> - Apply the skills acquired to prepare NPV as biopesticides and virus-based nanoparticles and their isolation using analytical methods. - Participate in extension activities and field, poultry, agriculture research station and aqua form visits. - .
		(b) Virus-based Biotechnology		<ul style="list-style-type: none"> - Acquire the skills to prepare the cell cultures and embryonated eggs for cultivation of viruses and to isolate and quantitate viruses. - Learn the methods to detect plant and animal viruses and to analyze various types of results obtained from serological and molecular viral diagnostic methods. - Apply the skills acquired to prepare virus-based nanoparticles and their isolation using analytical methods. - Participate in extension activities and field, poultry, agriculture research station and aqua form visits. -
2 4	VR - 40 5	(a) Applied Virology (OR)	2020	<ul style="list-style-type: none"> - Understand the basic concepts, types, requirements and methodologies of plant/animal cell and tissue cultures used for cultivation of plant and animal viruses. - Learn the production of recombinant DNA technology-based antibodies and vaccines to viruses and the concepts and methods of production of virus resistant/tolerant crops and virus-based biopesticides. - :Acquire knowledge about common virus infections caused to

			<p>human beings through vector and non-vector borne modes and basic principles of biosafety, biosecurity, and ethical/regulatory issues in Virology and basics in Intellectual Property Rights (IPR).</p> <ul style="list-style-type: none"> - Understand the utilization of viruses as viral genes/sequences as unique genetic resources, novel enzymes, gene expression activators and silencers, gene delivery systems, epitope display platforms and model systems in understanding the replication of nucleic acids and regulation of gene expression strategies and cancer biology, phage display and therapy technologies and viruses as biological weapons.
		(b) Virus-based Biotechnology	<p>Understand the basic concepts, types and methodologies of plant / animal cell and tissue cultures and exploitation of viruses as viral genes/sequences as unique genetic resources, novel enzymes, gene expression activators and silencers, gene delivery systems, epitope display platforms and model systems in understanding the replication of nucleic acids and regulation of gene expression strategies and cancer biology.</p> <p>Describe the exploitation of bacteriophages for peptide display and therapy, discuss the virus-based biopesticides and viruses as biological warfare, bio-crime and bioterrorism agents.</p> <p>Learn the concepts and methods of production of recombinant DNA technology-based antibodies and vaccines to viruses and understand the principles and applications of virus-based nanoparticles (virus nanoparticles and virus-like particles, VNPs and VLPs) in biotechnology.</p>

				Describe the concepts and methods of production of virus resistant/tolerant crops and guidelines of testing and releasing the transgenic lines in India and learn about biosafety, biosecurity guidelines to be followed to conduct virus-related research and discuss the ethical and regulatory issues in virus-related research and basic concepts of IPR and Indian patenting system. -
2 5	VR - 40 6	(a) Human virus diseases (OR)	2020	<ul style="list-style-type: none"> - Understand the clinical symptoms, prevention and treatment strategies of enteric viruses and different hepatitis viruses. - Understand the clinical symptoms, transmission, spread, laboratory diagnosis of viruses. - Acquire knowledge about viruses associated with exanthematous diseases and viral hemorrhagic fevers. - Learn about epidemiology, structure and replication, laboratory diagnosis, prevention and therapeutic interventions of HIV and know about viral oncogenesis and oncogenic viruses.
		(b) Clinical Virology		<ul style="list-style-type: none"> - Acquire basic understanding of virus taxonomy and virus properties and learn the concept of transmission, replication, cultivation and characterization of viruses. - Learn to collect, preserve the virus samples and detect the viruses by using biological, serological and molecular methods, good microbiological and laboratory practices used in the clinical

				<p>laboratories.</p> <ul style="list-style-type: none"> - Understand the properties, transmission, pathogenesis, epidemiology, diagnosis and detection of clinically important virus diseases. - Learn about the approaches used for prevention and control of clinically important infectious virus diseases.
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44. Zoology

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	ZOO-101	Invertebrata & Chordata	2020	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. In depth understanding of Anatomical features of Integumentary, Circulatory,</p>

				Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.
2	ZOO-102	Genetics & Evolution	2020	<p>i. Students will appreciate the concept of epigenetics as a key mechanism of regulation of gene expression steering development and cell fate that can ultimately be affected in disease condition</p> <p>ii. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations, Natural Selection and Genetic drift.</p> <p>iv. Understood the concepts of Micro, Macro evolution speciation categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.</p>
3	ZOO-103P	Practical-I Invertebrata & Chordata and Genetics	2020	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most</p>

				<p>primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. Understanding the comparative aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in taxonomy related research and job opportunities.</p> <p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p>
4	ZOO-104P	Practical-II Metabolic Regulation & Cell Function and Evolution	2020	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight</p>

				<p>into biological processes.</p> <p>iv. Understood that the four propositions underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
5	ZOO-105	Metabolic Regulation & Cell Function	2020	<p>i.The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of</p>

				Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.
6.	ZOO-106	Human Values and Professional Ethics-I	2020	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
			2020	
7.	ZOO-201	Cell Biology & Immunology	2020	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the</p>

				<p>ultra-structural information of animal cell besides the detailed views of the cell interior revealing the various events and actions of cell at the molecular level.</p> <p>iii. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the principles of Graft rejection, Auto immunity and Antibody based therapy.</p>
8.	ZOO-202	Molecular Biology	2020	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p> <p>ii. Students world gain expertise in understanding the complex molecular mechanisms occurring in cell and the applications of</p>

				<p>molecular technologies for betterment of life.</p> <p>iii. Understand and our apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the health Professions.</p>
9.	ZOO-203P	Practical-I Molecular Biology and Cell Biology	2020	<p>i. Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they will also know the various tools and techniques related to bacterial microbiology.</p> <p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p>
10.	ZOO-204P	Practical-II	2020	<p>i. The students will be able to explore an</p>

		Comparative Animal Physiology and Immunology		<p>original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fullest.</p> <p>iii. Learn the fundamental principles of immune response including molecular, biochemical and cellular basis of immune homeostasis.</p> <p>iv. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.</p>
11	ZOO-205	Comparative Animal Physiology	2020	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. An appropriate understanding of functioning of each system of different groups of animals with their comparison will be acquainted.</p> <p>iii. Understanding of the basic concepts of</p>

				<p>Physiological regulation, from cellular to organ to organismal.</p> <p>iv. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet</p> <p>.</p>
12	ZOO-206	Human Values and Professional Ethics-II	2020	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	ZOO-301	Developmental Biology	2020	<p>i. Students would gain expertise in explaining how a variety of interacting processes generate an organism's heterogenous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p>

				<p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity complex and coordinated systems in organisms the students can apply this knowledge for research, and education, to solve the problems related to development in animals through research.</p>
14	ZOO-302	Environmental Biology	2020	<p>i. Students will be able to apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.</p> <p>ii. Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.</p> <p>iii. Students will be able to be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p> <p>iv. Students will be able to use</p>

				technology, such as geographical information systems and computer programming, to assist in problem solving.
15	ZOO-303P	Developmental Biology and Tools & Techniques	2020	<p>i. Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>iv. Students would gain basic knowledge of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study</p>

				and understanding of life processes.
16	ZOO-304P	Environmental Biology and Enzymology	2020	<p>i. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to Education, Research and Extension programmes in his further career.</p> <p>ii. Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>iii. Students learn about enzymes. Their classification and nomenclature</p> <p>iv. Students learn about specificity of enzymes</p> <p>v. Students learn about measurement of enzymatic activity</p> <p>vi. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.</p>
17	ZOO-305A	Tools & Techniques	2020	<p>i. Students would be expertise techniques used for imaging, isolation, purification</p>

				<p>and characterization of various biological substances.</p> <p>ii. Identify and describe the different equipment and tools used in a biology laboratory.</p> <p>iii. Correctly operate different laboratory instruments.</p> <p>iv. Correctly operate different types of microscopes.</p> <p>v. Prepare tissue for section cutting and correctly operate a microtome.</p>
18	ZOO-305B	Enzymology	2020	<p>i. Students gain knowledge about regulation of enzyme activity with respective mechanisms</p> <p>ii. To understand about mechanism of enzymes in clinical diagnosis and their applications</p> <p>iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.</p>
19	ZOO-305C	Bioinformatics & Biostatistics	2020	<p>i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology.</p> <p>ii. Describe different methods of data handling using computer.</p>

				<p>iii. Perform basic operations of gene sequence retrieval and compare them using different software.</p> <p>iv. Perform basic operations of protein structure retrieval and comparison using different software.</p> <p>v. The student will learn about the Computer basics like Operating systems, Programming, Data Access, Internet and Nucleic acid Sequence and Protein Data Banks.</p> <p>vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of dispersion like Mean deviation and Standard deviation and Co-efficient of Variation.</p> <p>v. The course will aid in learning Test of significance like Null hypothesis and Alternative hypothesis, t-test, F-test, Chi-square test, Correlation and Regression analysis.</p>
20	ZOO-306A	Economic Zoology	2020	<p>i. Creating the self-employment opportunities to rural students through Animal husbandry, Aquaculture, Vermiculture and Sericulture.</p>

				<p>ii. To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices.</p> <p>iii. Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.</p>
21	ZOO-306B	Structural Biology	2020	<p>i. Understand the evolution of protein structural motifs and domains and associate this with function;</p> <p>ii. Use on-line structural databases and tools to predict the properties, structure and function of proteins.</p> <p>iii. Understand and explain enzyme mechanisms in a structural context.</p> <p>iv. Describe mechanisms of protein folding and the roles of natively unstructured proteins in biology.</p> <p>v. Understand how cross-talk between proteins and post-translational protein modifications (e.g. phosphorylation, ubiquitination) facilitate information processing in cells.</p>
22	ZOO-306C	Human Health and Infectious diseases	2020	<p>i. To understand the basic concepts of Infectious diseases and the role of immunity to control infections</p> <p>ii. Provides knowledge on the</p>

				<p>physiological mechanisms leading to diseased conditions.</p> <p>iii. Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv. This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>
23	ZOO-401	Neurobiology	2020	<p>i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials</p> <p>ii. Students leant and gain knowledge on structure and function of different types of Synapses</p> <p>iii. Gained information on different types of Neurotransmitters i.e. Amino acids and Peptides.</p>
24	ZOO-402	Toxicology	2020	<p>i. The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research.</p> <p>ii. Understanding of the physiological and genotoxic effects of drugs and environmental toxins.</p> <p>iii. To understand various types of insecticides and understand their mode of</p>

				<p>action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible with other control strategies.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p>
25	ZOO-403P	Neurobiology and Animal Biotechnology & Microbiology	2020	<p>i. Learnt about structure, function and organization of Neurons in the Central nervous system</p> <p>ii. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials.</p> <p>iii. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny.</p> <p>iv. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effectively communicate with both specialist and non-specialist audiences/community.</p>
26	ZOO-404P	Toxicology and Animal Behavior & Wild life	2020	<p>i. Skill development in environmental and occupational Toxicology.</p>

				<ul style="list-style-type: none"> ii. It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain. iii. Identification of different routes of exposure of environmental toxins. iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning. v. To understand the overview of Animal Behavior and prominence of social organization in insects and primates. vi. Gained lot of information on different types of Learning phenomenon and their mechanisms. vii. To understand how to conserve the wild animals
27	ZOO-405A	Animal Biotechnology & Microbiology	2020	<ul style="list-style-type: none"> i. Understanding of in vitro culturing of organisms and production of transgenic animals. ii. Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors. iii. This insight allows students to take into consideration about ethical issues

				<p>involved in production of transgenic animals and BT products.</p> <p>iv. Use in gene transfer technology, genetic manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p> <p>v. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny</p> <p>vi. Classify the nutritional types of microorganisms and measure microbial growth</p> <p>vii. Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>viii. Assess impact of plant- microbe interaction on agriculture in both beneficial and detrimental ways. Identify industrially important microbes.</p>
28	ZOO-405B	Animal Behavior & Wild life	2020	<p>i. Understand the overview of Animal Behavior and prominence of social organization in insects and primates</p> <p>ii. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>iii. To understand the how to conserve wild animals and management strategies.</p>

				iv. To gain the knowledge about wild animals and animal products importance.
29	ZOO-405C	Endocrinology	2020	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic pathways.</p> <p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
30	ZOO-406A	Genetic Engineering	2020	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p> <p>ii. Students will be able to perform basic genetic engineering experiments at the end of course.</p> <p>iii. Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.</p>
31	ZOO-406B	Environmental Impact Assessment & Green Auditing	2020	i. Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment

				<p>ii. Explain the importance of environmental audits and other management tools in business for social benefit by improving environmental performance</p> <p>iii. Calculate the carbon footprint of any organization and identify suitable mitigation strategies for carbon reduction solutions.</p>
32	ZOO-406C	Medical Biotechnology, IPR, Biostatistics and Bioethics	2020	<p>i. Students will gain awareness about Intellectual Property Rights (IPR) to take measures for protecting their ideas.</p> <p>ii. Gains knowledge on the Developmental stages of organism in Animal Biotechnology.</p> <p>iii. To understand and they will be able to devise business strategies by taking account of IPRs.</p> <p>iv. Students will develop awareness about bioethics and biosafety, Authorship and patenting / commercial rights and conflicts.</p>

Animal Biotechnology

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/Skill Development
1	ABT-Core- 101	Metabolic Regulation & Cell Function (MRCF)	2020	<ul style="list-style-type: none"> • Knowledge on chemical bonds, thermodynamics principles and metabolisms of Glycolysis, TCA Cycle and their biomedical importance will be gained. • Metabolic disorders of urea cycle and importance of proteins structure and functions can be understood. • Biosynthesis of purine and pyrimidine nucleotide and Clinical disorders of purine and pyrimidine metabolism can be learnt • To become proficient in Biomedical importance of lipids and over view metabolism of carbohydrate, protein and lipids
2	ABT-Core- 102	Tools & Techniques (TT)	2020	<ul style="list-style-type: none"> • Skills will be acquired on chromatography, centrifugation, electrophoresis and blotting techniques • To get knowledge on cell and tissue culture, cell types, culture media and overview of stem cell biology • To acquire skill on electrogenic spectrum, type of detectors, electrophysiological methods and brain

				<p>activity recording techniques</p> <ul style="list-style-type: none"> • Microscopic techniques, different fixation and staining techniques, tissue processing for microtomy, cryotechniques will be learnt
3	ABT-Core-P-103	Metabolic Regulation & Cell Function	2020	<ul style="list-style-type: none"> • Practical knowledge will be gained on biochemical assays like estimation of proteins, structural proteins, soluble proteins, free amino acids, total carbohydrates and total cholesterol. • To gain knowledge in handling equipments like cooling centrifuge, autoclave, laminar air flow etc., and, maintenance of animal cell culture laboratory. <p>To learn microbial media preparation for their culture and identification</p>
4	ABT-Core-P-104	Tools & Techniques	2020	<ul style="list-style-type: none"> • Isolation of DNA from chick liver • Agarose gel electrophoresis • Estimation of DNA and RNA by diphenyl aniline method and orcinol method • Paper chromatography • Plating procedures • Gram staining • Anti microbial susceptibilities test

5	ABT-CF-105	Microbiology and Diseases	2020	<ul style="list-style-type: none"> • Microorganisms classification and structure of prokaryotic and eukaryotic microorganism can be understood • To get knowledge on Nutritional requirements to microorganisms, growth of microorganism, control of microorganism and microbes of biotechnological importance • To become proficient in chemical nature of gene, plasmids incompatibility, horizontal transfer of genome among the microbial community and Benzer's classical studied on II locus • To learn diseases caused by microorganism
6	ABT -EF-106	Human Values & Professional Ethics (HVPE)-I	2020	<ul style="list-style-type: none"> • Knowledge will be gained on nature of ethics its relation to religion. Politics, Business • To understand nature of values Good and Bad, end and means, analysis of basic moral concepts, good behavior and respect for elders, character and conduct • Proficient on hagavad Githa • Crime and theories of punishment will be learnt
7	ABT-Core- 201	Molecular Biology (MB)	2020	<ul style="list-style-type: none"> • To gain knowledge on DNA structure, genome of Nuclear and mitochondrial and maternal Inheritance • To understand replication in

				<p>prokaryotes, Enzymology of DNA replication, Discontinuous replication and Bidirectional replication</p> <ul style="list-style-type: none"> • Synthesis of RNA, Types of RNA, Genetic code and Ribosome structure will be understood <p>Knowledge will be gained regulation I and II and Operon concepts</p>
8	ABT-Core- 202	Animal Cell culture & Stem Cell Biology (ACC-SCB)	2020	<ul style="list-style-type: none"> • To understand animal cell culture, biology of stemcells and embryonic stem cell • To learn propagation of embryonic stem cells, nuclear transfer technology, animal cloning and stem cell differentiation • To gain knowledge on stem cell plasticity, stem cell assay and protocols, stem cell separations and stem cell therapies <p>To learn stem cells and tissue engineering, human embryonic stem cells and society, intellectual property results</p>
9	ABT-Core-P-203	Molecular Biology & Immunology	2020	<ul style="list-style-type: none"> • Effect of UV radiation on bacterial growth • SDS PAGE • Electrophoresis • Blood grouping

				<ul style="list-style-type: none"> • Blood smear preparation • RBC count • Radial Immuno Diffusion • Neubauer chamber
10	ABT- Core-P- 204	Animal Cell culture & Stem Cell Biology & Cell Biology	2020	<ul style="list-style-type: none"> • Laboratory safety rules and regulations • Animal handling and care • Preparation of cell culture media • Staining of animal cells • Preparation of cell lines • Culture of virus in chick embryo
11	ABT- CF- 205	Cell Biology & Immunology (CB&IM)	2020	<ul style="list-style-type: none"> • Able to learn organization of prokaryotic and eukaryotic cell, Nucleus structure, Eukaryotic chromosome and polytene and lamp brush chromosomes • To learn mechanism of cell division, regulation of eukaryotic cellcycle, chromosomal abnormalities and tumor biology • To understand types of immunity, types of cell involved in immune response, structure and function of antibody and complimentary cascade • To gain knowledge on Antigen presentation, hypersensitivity reactions, immune tolerance and immunopathology

12	ABT- EF-206	Human Values & Professional Ethics (HVPE)-II	2020	<ul style="list-style-type: none"> • To gain knowledge on value education • To learn medical ethics • To become proficient on business ethics • To understand environmental ethics and social ethics
13	ABT- Core- 301	Enzymology (ENZ)	2020	<ul style="list-style-type: none"> • To understand enzyme specificity, enzyme catalysis and isolation and purification of enzymes • To gain knowledge on theories of enzymes kinetics, enzyme kinetics and its importance, effect of reactant concentrations and effect of temperature of pH and enzyme concentration reaction rate • To become proficient on clinical aspects of enzymology, immobilized enzymes, isoenzymes and enzyme engineering
14	ABT- Core- 302	Animal Reproduction, Breeding & Transgenic Technology (ARBTT)	2020	<ul style="list-style-type: none"> • To become proficient on structure and function of male and female reproductive system; reproductive cycles and contraception in male and females • To gain skill on sex determination, selection for qualitative inherited characters, parental determination and verification and progeny testing • To understand artificial insemination techniques, in vitro fertilization, embryo

				transfer technology, microinjection and macroinjection <ul style="list-style-type: none"> To learn transgenic technology development, generation of chimeric, transgenic and knockout mice
15	ABT-Core-P-303	Enzymology & Genetic Engineering	2020	<ul style="list-style-type: none"> To determine the effect of substrate concentration, enzyme concentration and temperature on enzyme activity Measures of central tendency regression and correlation analysis T-test
16	ABT-Core-P-304	Animal Reproduction, Breeding & Transgenic Technology & Environmental Biotechnology	2020	<ul style="list-style-type: none"> To estimate the sperm motility, sperm count , sperm membrane integrity test and pH of semen. Determination sperm viability Retrieval of gene and protein sequence from gene and protein bank, redelivery
17	GE-305A	Cancer Biology	2020	<ul style="list-style-type: none"> To gain knowledge on cancer types and tumor development To learn oncogenes, mechanisms of onogene activation and chromosomal translocation To understand cell cycle regulation and cancer, DNA Damage and repair To learn tumor immunology, Vaccine

				development, tumor cell evasion of immune defenses
18	GE-305B	Animal Biotechnology & Industrial Applications	2020	<ul style="list-style-type: none"> • To gain knowledge on preservation animals engineered bacteria/yeast/ cell lines, metabolic engineering, fermentative production and glycolytic pathway • To understand monoclonal antibodies production and genetically engineered products • To know the DBT guidelines, Global scenario of transgenic micro organisms and ethical issues related to biotechnology products
19	GE-305C	Biostatistics & Bioinformatics	2020	<ul style="list-style-type: none"> • To understand prediction of protein structure and protein sequence database, prediction of gene structure, submission of sequence to database, phylogenetic analysis • To learn biostatistics, measures of location and dispersion, curve fitting and correlation and regression • To understand probability distribution, tests of significance, student t-test and F-test, chi square test and their application
20	OE-306A	Environmental Biotechnology (EBT)	2020	<ul style="list-style-type: none"> • To gain knowledge on waste and pollutants, hazards from wastes and pollutants and hazards from chemicals in

				<p>wastes</p> <ul style="list-style-type: none"> • Waste treatment, treatment of liquid wastes, treatment of solid waste and contributions of biotechnology to waste treatment will be understood • To become proficient in aerobic waste water treatment and measurement of pollution levels • To learn anaerobic treatment of waste water, biodegradation of xenobiotics compounds, hazards from xenobiotics and bioremediation
21	OE-306B	Genetic Engineering (GE)	2020	<ul style="list-style-type: none"> • Use of enzymes in DNA and RNA synthesis, restriction enzymes and ligation and modification o DNA • To learn vectors for constructions of genomic libraries, expression vectors, promoters and vectors used for cloning • To gain knowledge on DNA fragments, cDNA synthesis, PCR • To become proficient on ligation between cohesive and blunt end DNA fragments, introduction of cloned genes into host and expression of cloned genes
22	ABT- Core- 401	Medical Biotechnology (MBT)	2020	<ul style="list-style-type: none"> • To understand disease diagnosis, use of monoclonal antibodies in detection of genetic disease • To learn Disease treatment, interferons, growth factor, and antisense

				<p>nucleotide as therapeutic agent</p> <ul style="list-style-type: none"> • To gain knowledge on gene therapy, types of gene therapy, augmentation therapy and targeted transfer • To become proficient on forensic medicine, preparation of DNA sample. Approaches for DNA analysis and applications of forensic medicine
23	ABT- Core- 402	Fermentation Technology and Down streaming Process (FTDSP)	2020	<ul style="list-style-type: none"> • To understand cell distribution methods, separation techniques, purification by chromatographic techniques and isolation and screening and maintenance of industrially importance microbes • To learn bioreactor design, fermentation economics, upstream processing, membrane based separations <p>To gain knowledge on importance of downstream processing economics of downstream processing</p>
24	ABT- Core-P- 403& 404	Project and Viva- Voce	2020	<ul style="list-style-type: none"> • Students must perform project work which includes experiments related to Toxicology, Animal Tissue culture, Fermentation technology or any work related to biology. <p>After completion of project work students</p>

				<p>have to prepare dissertation by their own and submit to the committee members.</p> <ul style="list-style-type: none"> • Evaluation of dissertation will be conducted by committee members through Viva-Voce
25	GE-405A	Biosafety, Bio Ethics & Intellectual Property rights	2020	<ul style="list-style-type: none"> • To understand socio-economic and legal impact of biotechnology, use of genetically modified organisms, moral and ethical issues in biotechnology and safety issues with GMO • To learn intellectual property right, evaluation of patenting, application of GATT and IPR and WTO Act and global and Indian biodiversity • To gain knowledge on Indian Patent Act 1970, role of country patent office, U.S. Patent trademark office and U.S. Paten system Vs Indian Patent system • To gain knowledge on Ethics and genetic engineering, patent of genes, human cloning, stem cell, regulatory requirements for drugs and biologics, GLP and GMP
26	GE-405B	Drug design and Development	2020	<ul style="list-style-type: none"> • To learn drug design, analog approach of drug designing

				<ul style="list-style-type: none"> • To understand SAR Vs QSAR, Partition coefficient, Hammett substituent constant and Taft's steric constant, Free Wilson mode, 3D-QSAR approach like COMFA and COMIA • To gain knowledge on pharmacological screening and assays, pharmacological screening models for therapeutic areas, cell based assay, biochemical assay, radiological binding assay, small molecule manufacturing • To learn Drug Laws, FDA, OECD, ICH, Schedule Y, drug registration, Regulations of human pharmaceuticals and biological products, and clinical trial design
27	GE-405C	Animal Cell Culture Techniques	2020	<ul style="list-style-type: none"> • To understand Animal cell culture, culture medium, characteristics of cell in culture, measurement of viability and cytotoxicity, cell types and apoptosis • To gain knowledge in scaling up of animal cell culture, cell transformation, tissue engineering, transgenic animals, animal cloning • To become proficient in improvement

				of biomass, pharming products, plasminogen activator and ethical issues related to biotechnology products
28	OE-406A	Advanced Genomics and Proteomics	2020	<ul style="list-style-type: none"> • To learn structure of Prokaryotic and Eukaryotic genomes, Isolation and purification of genomic DNA, Construction of Physical maps and Whole genome sequence alignment • To understand genome annotation, methods for gene identification, functional genomics, transcript profiling • To learn protein structure, sample preparation and separation 2D-analysis, Multidimensional liquid chromatography, protein-protein interactions analysis <p>To gain knowledge on DNA /protein sequence homologies, Gene duplication and</p>
29	OE-406B	Bio resource Technology (Apiculture, Sericulture, Aquaculture, Vermiculture)	2020	<ul style="list-style-type: none"> • To understand Types of honey bees, life history of honey bees, management of apiculture and by products of honey bees and economic importance disease and their control • To become proficient on fresh water fin fish culture, shell fish (prawn and Pearls) culture

				<ul style="list-style-type: none"> To understand historical background of vermicompost, methods of vermiculture and problems involved in vermicompost
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45. Business Management

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	MBA 101	Management And Organisational Behaviour	2020	<p>Examine the Management concepts and functions.</p> <p>Apply the concepts of planning, decision making.</p> <p>Apply the concepts of delegation of authority, decentralisation and departmentation in real life situations.</p> <p>Analyse the controlling principles and practices, Ethics and corporate social responsibility.</p> <p>Evaluate the basic concepts of organizational conflicts and climate.</p>
2	MBA 102	Managerial Communications	2020	<p>Apply the basic concepts of communication for business correspondence.</p> <p>Distinguish different forms of communication.</p> <p>Evaluate different types of communication.</p>

				Adapt report writing skills of different types on need basis. Acquire presentation skills along with the interview techniques.
3	MBA 103	Managerial Economics	2020	Describe the importance of managerial economics and its contribution to decision making in different types of business organizations by the managerial economist. Apply the basic principles of managerial economics. Apply demand analysis concept in the real life business situations. Discuss the meaning and usefulness of the production function and cost function in analysing the firm's production activity.
4	MBA 104	Accounting For Managers	2020	Outline the basic knowledge of accounting, bookkeeping, accounting Principles, accounting cycle. Apply the concepts of journal, ledger and Trail balance. Identify the nature of expenditure and revenue for preparation of financial statements of business. Examine the role of accounting policies like depreciation.
5	MBA 105	Quantitative Analysis	2020	Recall the fundamentals in Mathematics

		For Management Decisions		and Statistics. Demonstrate the methods to solve derivatives, progressions and gaming. Choose decision making in a competitive situation. Solve transportation Problem with minimum cost of transport of commodities.
7	MBA 106	Business Statistics	2020	About the information needs, sources of data and measures of central tendency . The concept of Scientific Research and the methods of conducting Scientific Enquiry. The Statistical Tools of Data Analysis.
8	MBA 108	Human Values And Professional Ethics	2020	About ethics, values and morals. The concepts of value based education and its relevance. Learn about environmental and social ethics
9	MBA 201	Marketing Management	2020	Outline the concepts of marketing. Create the segmentation, targeting and positioning in marketing. Analyse various phases of product life cycle. Evaluate various methods of pricing and identify the best pricing strategy. Evaluate marketing communication strategies.
10	MBA 202	Financial Management	2020	Outline the basic concepts of Financial

				<p>Management.</p> <p>Comprehend the various methods of Investment Analysis and apply various techniques of capital budgeting.</p> <p>Adapt the concepts of leverage, capital structure and its effect on the long term survival of the firm.</p> <p>Appraise various methods of computation of cost of capital.</p>
11	MBA 203	Human Resources Management	2020	<p>Outline the functions and challenges of HRM.</p> <p>Apply different concepts of HR Planning, Recruitment, Selection, Training, Interviewing Techniques and Executive Development Programs.</p> <p>:Apply the uses of job analysis, job description, job specification, ergonomics in industry and the methods of job evaluation.</p> <p>Utilize the various methods of performance appraisal.</p>
12	MBA 204	Production Management	2020	<p>Apply the basic concepts of production and operations management and identify types of manufacturing processes.</p> <p>Define and explain concept of production planning and control.</p> <p>Identify effective plant location and plant layout.</p> <p>Design strategies to improve</p>

				productivity.
13	MBA 205	Business Research Methods	2020	Adapt the fundamentals of Business research methodology. Identify research problem. Apply sample and census survey and measuring techniques. Design data collection techniques. Develop data processing procedures and apply tools. Draft thesis/report writing.
14	MBA 207	Management Information Systems	2020	Understand various types of information systems. Analyse the various functional information systems
15	MBA 206	Operation Research	2020	Understand various concepts and techniques of OR. Apply various OR techniques to improve the efficiency of the organisations.
16	MBA 208	Leadership Values and Styles	2020	Identify the leadership qualities to run an organization successfully. Appraise the various concepts of value based leadership.

46. Computer Science

Master of Computer Application(MCA)

S.	Course	Title of the Course	Years of	Activities/Content with direct bearing
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No.	Code		Introduction	on Employability/Entrepreneurship/Skill development
1	MCA 101	Discrete Mathematical Structures	2020	<ol style="list-style-type: none"> 1. The students become familiar with the Sampling Distributions like with replacement and without replacement 2. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it. 3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution
2	MCA 102	Object Oriented Programming with Java	2020	<ol style="list-style-type: none"> 1. Solve and Implement solution for the problem using java basic elements like variables, control structures. 2. Handle Object Oriented Concepts effectively in the real time problems. 3. Understand the architecture and working procedure of platform independent language JAVA SDK.
3	MCA 103	Computer Organization	2020	<ol style="list-style-type: none"> 1. To gain knowledge about the Micro Processors.

				<ol style="list-style-type: none"> 2. To study the hierarchical memory system including cache memories and virtual memory.
4	MCA 104	Operating Systems	2020	<ol style="list-style-type: none"> 1. Learn evaluation of different types Operating System and their functionalities. 2. Learn Internal structure and the function procedure of Operating system in detail.
5	MCA 105	105A.Accounting and Financial management 105B.Accounting Essentials for Computer Applications	2020	<ol style="list-style-type: none"> 1. Use of Accounting information to managers with in the organization. 2. Informs the business decision & control the Management Functions.
6.	MCA 106 P	Software Lab I (based on 101 & 103)	2020	<ol style="list-style-type: none"> 1. The students become familiar with the Sampling Distributions like with replacement and without replacement 2. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it. 3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution. 4. To gain knowledge about the Micro Processors.

				5. To study the hierarchical memory system including cache memories and virtual memory
7.	MCA 107 P	Object Oriented Programming Lab	2020	<ol style="list-style-type: none"> 1. Solve and Implement solution for the problem using java basic elements like variables, control structures. 2. Handle Object Oriented Concepts effectively in the real time problems. 3. Understand the architecture and working procedure of platform independent language JAVA SDK.
8.	MCA 108P	Operating Systems Lab	2020	<ol style="list-style-type: none"> 1. Learn evaluation of different types Operating System and their functionalities. 2. Learn Internal structure and the function procedure of Operating system in detail.
9.	MCA 201	Computer Oriented Operations Research	2020	<ol style="list-style-type: none"> 1. solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities. 2. formulate and solve problems as networks and graphs and set up decision models and use some solution methods for nonlinear optimization problems.

				<ol style="list-style-type: none"> 3. analyse the general nonlinear programming problems. 4. formulate the nonlinear programming models.
10.	MCA 202	Data Structures using Java	2020	<ol style="list-style-type: none"> 1. Develop a program a structured Programming Using JAVA. 2. Develop a Memory Handling work & Sequential Data file handling. 3. Maintain data using proper data organizing structures.
11	MCA 203	Data Communication and Computer Networks	2020	<ol style="list-style-type: none"> 1. Understand the Network Terminologies and the components used to build networks. 2. Understand Network Models (Topologies) to establish networked systems. 3. Understand the internal architecture, working procedure of OSI Layer and Protocols.
12	MCA 204	Advanced Database Management Systems	2020	<ol style="list-style-type: none"> 1. Students will get an attempt to provide with the advanced information about ADBMS and their development. 2. This Subject also provides the conceptual background necessary to design and develop distributed database System for real life applications and also helps to learn Query optimization, centralized

				<p>query optimization, Distributed query optimization algorithms.</p> <p>3. How SQL Programs are implemented as a series of primitive operations and how DDBs are implemented and how applications are design for those DDB</p>
13	MCA 205	205A. E-Commerce	2020	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems. 3. Understand the processes of developing and implementing information systems and be aware of the ethical, social, and security issues of information systems;
14		205B. Cyber Security	2020	<ol style="list-style-type: none"> 1. Analyze and evaluate the cyber security needs of an organization and determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation. 2. Measure the performance and troubleshoot cyber security systems and implement cyber security solutions and use of cyber security,

				<p>information assurance, and cyber/computer forensics software/tools.</p> <p>3. Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators, Design and develop a security architecture for an organization and design operational and strategic cyber security strategies and policies.</p>
15		205C. Neural Networks	2020	<p>1. Define what is Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network.</p> <p>2. Analyze ANN learning, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning and Boltzmann learning.</p> <p>3. Implement Simple perception, Perception learning algorithm, Modified Perception learning algorithm, and Adaptive linear combiner, Continuous perception, learning in continuous perception.</p>
16	MCA 301	Software Engineering	2020	<p>1. Develop a system in a systematic way by using various Prescriptive Process models like Waterfall and</p>

				<p>SDLC.</p> <ol style="list-style-type: none"> 2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements. 3. Analyze and translate a specification into a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse
17	MCA 302	Computer Graphics	2020	<ol style="list-style-type: none"> 1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics. 2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis and Use of geometric transformations on graphics objects and their application

				<p>in composite form.</p> <p>3. Extract scene with different clipping methods and its transformation to graphics display device, Explore projections and visible surface detection techniques for display of 3D scene on 2D screen and Render projected objects to naturalize the scene in 2D view and use of illumination models for this.</p>
18	MCA 303	Web Technologies	2020	<p>1. Explain the history of the internet and related internet concepts that are vital in understanding web development.</p> <p>2. Discuss the insights of internet programming and implement complete application over the web and students can Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.</p> <p>3. Utilize the concepts of JavaScript and Java, Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.</p>

19	MCA 304	304A.Data warehousing and Data mining	2020	<ol style="list-style-type: none"> 1. To identify the scope and essentiality of Data Warehousing and Mining and to analyze data, choose relevant models and algorithms for respective applications. 2. To study spatial and web data mining. 3. Students develop research interest towards advances in data mining.
20		304B.Big Data Analytics	2020	<ol style="list-style-type: none"> 1. Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. 2. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. 3. Students Interpret business models and scientific computing paradigms, and apply software tools for big data analytics and achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications
21		304C System Programming	2020	<ol style="list-style-type: none"> 1. Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems).

				<ol style="list-style-type: none"> 2. Ability to use theoretical and applied information in these areas to design system software with realistic constraints. 3. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language programming and Unix shell programming.
22	MCA 305	305A. Cryptography and Network Security	2020	<ol style="list-style-type: none"> 1. Provide security of the data over the network and do research in the emerging areas of cryptography and network security. 2. Implement various networking protocols. 3. Protect any network from the threats in the world
23		305B. Artificial Intelligence	2020	<ol style="list-style-type: none"> 1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations and Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning. 2. Demonstrate awareness and a fundamental understanding of various applications of AI

				<p>techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.</p> <p>3. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool, Demonstrate proficiency in applying scientific method to models of machine learning and Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.</p>
24		305C.Mobile Application Development	2020	<p>1. Identify various concepts of mobile programming that make it unique from programming for other platforms, Critique mobile applications on their design pros and cons.</p> <p>2. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,</p> <p>3. Program mobile applications for the Android operating system that use basic and advanced phone features, and deploy applications to the Android marketplace for distribution.</p>
25	MCA 401	401A.Cloud Computing	2020	<p>1. Explain the core concepts of the</p>

				<p>cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.</p> <ol style="list-style-type: none"> 2. Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient. 3. Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model. 4. Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS.
26		401B. Dot Net Technologies	2020	<ol style="list-style-type: none"> 1. To explore .NET technologies for designing and developing dynamic, interactive and responsive web applications. 2. Provide a consistent, object-oriented programming environment whether object code is stored and

				<p>executed locally, executed locally but webdistributed, or executed remotely.</p> <p>3. Make the developer experience consistent across widely varying types of apps, such as Windowsbased apps and Web-based apps.</p>
27		401C. Software Testing	2020	<p>1. List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects.</p> <p>2. Distinguish characteristics of structural testing methods and demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible.</p> <p>3. Discuss about the functional and system testing methods and demonstrate various issues for object oriented testing.</p>
28	MCA 402	402A. Essentials of Data Science	2020	<p>1. Having a clear understanding of the subject related concepts and contemporary issues.</p> <p>2. Having problem-solving ability- to assess social issues and engineering problems.</p>

				<ul style="list-style-type: none"> 3. Having a clear understanding of professional and ethical responsibility. 4. Having cross-cultural competency exhibited by working as a member or in teams. And having a good working knowledge of communicating in English – communication with the engineering community and society
29		402B.Deep Learning	2020	<ul style="list-style-type: none"> 1. Understand the role of deep learning in machine learning applications and get familiar with the use of TensorFlow/Keras in deep learning applications. 2. Compare Various deep learning Algorithms used for Classification Segmentation and detection. 3. Apply various concepts related with Deep Learning to solve Problems. Analyse different deep learning models in Image related projects.
30		402C.Internet of Things	2020	<ul style="list-style-type: none"> 1. Able to understand the application areas of IOT. 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. 3. Able to understand building blocks of Internet of Things and

				characteristics.
31	MCA 403	Major Project Work	2020	

M.Sc (CS) : Master of Computer Science

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	MSCS - 101C	Computer Organization	2020	<ol style="list-style-type: none"> 1. To gain knowledge about the Micro Processors. 2. To study the hierarchical memory system including cache memories and virtual memory.
2	MSCS - 102C	Programming in Java & Data Structures	2020	<ol style="list-style-type: none"> 1. Develop a program a structured Programming Using JAVA. 2. Develop a Memory Handling work & Sequential Data file handling. 3. Maintain data using proper data organizing structures.
3	MSCS - 103C	Operating Systems	2020	<ol style="list-style-type: none"> 1. Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,. 2. Analyze important algorithms eg. Process scheduling and memory management algorithms. 3. Categorize the operating system's

				<p>resource management techniques, dead lock management techniques, memory management techniques.</p> <p>4. Demonstrate the ability to perform OS tasks in Red Hat Linux Enterprise.</p>
4	MSCS – 104 GE – A	Mathematical Foundations For Computer Science	2020	<ol style="list-style-type: none"> 1. Ability to apply mathematical logic to solve problems. 2. Understand sets, relations, functions, and discrete structures. 3. Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions. 4. Able to formulate problems and solve recurrence relations. 5. Able to model and solve real-world problems using graphs and trees.
5	MSCS – 104 GE - B	Computer Oriented Operational Research	2020	<ol style="list-style-type: none"> 1. Solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities. 2. Formulate and solve problems as networks and graphs and set up decision models and use some solution methods for nonlinear optimization problems.

				<ul style="list-style-type: none"> 3. Analyse the general nonlinear programming problems. 4. Formulate the nonlinear programming models.
6	MSCS - 05CF	Environmental Studies	2020	<ul style="list-style-type: none"> 1. Articulate the interconnected and interdisciplinary nature of environmental studies. 2. Demonstrate an integrative approach to environmental issues with a focus on sustainability. 3. Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences, and humanities in environmental problem solving. 4. Communicate complex environmental information to both technical and non-technical audiences. 5. Understand and evaluate the global scale of environmental problems and reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.
7	MSCS - 106EF	1. A. PC HardwareBasics	2020	<ul style="list-style-type: none"> 2. Identify the hardware components of a computer. Lists the hardware components such as processor,

				<p>memory, disk, main board, etc.</p> <ol style="list-style-type: none"> 3. Explains the features of the hardware components of a computer. Explains the relationships between the components of a computer and how data are transferred among the components. 4. identify the peripheral devices outside computer. Uses computer using input devices, such as keyboard and mouse. 5. Transfers data outside the computer using output devices, such as screen and printer. Saves files to removable devices and loads files from removable devices. 6. Connects to the Internet using network cards. identify the software's running on a computer. Identifies BIOS and changes settings in BIOS.
8	MSCS - 106EF	B. Statistical Methods	2020	<ol style="list-style-type: none"> 1. Calculate and interpret the correlation between two variables. Calculate the simple linear regression equation for a set of data. 2. Employee the principles of linear regression and correlation,

				<p>including least square method, predicting a particular value of Y for a given value of X and significance of the correlation coefficient.</p> <ol style="list-style-type: none"> 3. Know the association between the attributes. Know the construction of point and interval estimators. 4. Evaluate the properties of estimators. Demonstrate understanding of the theory of maximum likelihood estimation.
9	MSCS - 201C	Advanced Data Base Management System	2020	<ol style="list-style-type: none"> 1. Explain and evaluate the fundamental theories for advanced database architectures and query operators. 2. Design and implement parallel database systems with evaluating different methods of storing, managing of parallel database. 3. Assess and apply database functions of distributed database. Evaluate different database designs and architecture. 4. Administer and analyze database with query optimization techniques and develop Web interface with database. 5. Understand advanced querying and

				decision support system.
10	MSCS - 202C	Computer Networks	2020	<ol style="list-style-type: none"> 1. Describe the general principles of data communication. Describe how computer networks are organized with the concept of layered approach. 2. Describe how signals are used to transfer data between nodes. Implement a simple LAN with hubs, bridges and switches. 3. Describe how packets in the Internet are delivered. Analyze the contents in a given data link layer packet, based on the layer concept. 4. Design logical sub-address blocks with a given address block. Decide routing entries given a simple example of network topology. 5. Describe what classless addressing scheme and how routing protocols work.
11	MSCS - 203C	Computer Graphics	2020	<ol style="list-style-type: none"> 1. The course introduces the basic concepts of computer graphics. It provides the necessary theoretical background and demonstrates the application of computer science to graphics. The course further allows students to develop programming skills in computer graphics through

				<p>programming assignments.</p> <ol style="list-style-type: none"> 2. Understands the core concepts and mathematical foundations of computer graphics knows fundamental computer graphics algorithms and data structures. 3. Has an overview of different modeling approaches and methods and has detailed knowledge about basic shading and texture mapping techniques. 4. Understands light interaction with 3D scenes.
12	MSCS- 204 GE – A	E- Commerce	2020	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems. Understand the processes of developing and implementing information systems. 3. Be aware of the ethical, social, and security issues of information systems;
13	MSCS- 204 GE B	Accounting AndFinancial Management	2020	<ol style="list-style-type: none"> 1. Use of Accounting information to managers within the organization. 2. Informs the business decision & control the Management Functions.
14	MSCS-	Human Rights And Value	2020	<ol style="list-style-type: none"> 1. understand the historical growth of

	205CF	Education		<p>the idea of human rights.</p> <ol style="list-style-type: none"> 2. demonstrate an awareness of the international context of human rights. 3. demonstrate an awareness of the position of human rights in the UK prior to 1998. 4. understand the importance of the Human Rights Act 1998, analyse and evaluate concepts and ideas.
15	MSCS- 206 EF A	Principles Of Management	2020	<ol style="list-style-type: none"> 1. Understand the concepts related to Business. 2. Demonstrate the roles, skills and functions of management. 3. Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions. 4. Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
16	MSCS- 206 EF B	Internet Of Things	2020	<ol style="list-style-type: none"> 1. Able to understand the application areas of IOT. 2. Able to realize the revolution of Internet in Mobile Devices, Cloud

				<p>& Sensor Networks.</p> <p>3. Able to understand building blocks of Internet of Things and characteristics.</p>
17	MSCS-301C	Data Warehousing and Data Mining	2020	<p>1. Understand the functionality of the various data mining and data warehousing component.</p> <p>2. Appreciate the strengths and limitations of various data mining and data warehousing models.</p> <p>3. Explain the analyzing techniques of various data.</p> <p>4. Describe different methodologies used in data mining and data warehousing.</p> <p>5. Compare different approaches of data warehousing and data mining with various technologies.</p>
18	MSCS-302C	Web Technologies	2020	<p>1. Analyze a web page and identify its elements and attributes.</p> <p>2. Create web pages using XHTML and Cascading Style Sheets.</p> <p>3. Build dynamic web pages using JavaScript (Client side programming). Create XML documents and Schemas.</p> <p>4. Build interactive web applications using AJAX.</p>
19	MSCS-303C	Software Engineering	2020	<p>1. Develop a system in a systematic</p>

				<p>way by using various Prescriptive Process models like Waterfall and SDLC.</p> <ol style="list-style-type: none"> 2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements. 3. Analyze and translate a specification into a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse
20	MSCS -304-GE-A	Systems Programming	2020	<ol style="list-style-type: none"> 1. Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems). 2. Ability to use theoretical and applied information in these areas

				<p>to design system software with realistic constraints.</p> <ol style="list-style-type: none"> 3. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language programming and Unix shell programming. 4. Ability to devise, select, and use modern techniques and tools needed for the design and implementation of system programs.
21	MSCS -304-GE-B	Computer Algorithms	2020	<ol style="list-style-type: none"> 1. Apply design principles and concepts to algorithm design (c) 2. Have the mathematical foundation in analysis of algorithms (a, j) 3. Understand different algorithmic design strategies (j) 4. Analyze the efficiency of algorithms using time and space complexity theory (b)
22	MSCS -304-GE-C	UID Using .NetTechnologies	2020	<ol style="list-style-type: none"> 1. Provide a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but web distributed, or executed remotely. 2. Build all communication on

				<p>industry standards to ensure that code based on .NET Framework integrates with any other code.</p> <ol style="list-style-type: none"> 3. Building multi-tier enterprise applications. 4. Client-side programming: HTTP, CGI, Cookies, JavaScript, HTML, XML.
23	MSCS -304-GE-D	IT in Forensic Science	2020	<ol style="list-style-type: none"> 1. Approach analysis of evidence without bias. 2. Develop a conceptual understanding of criminal justice system, rules of evidence, legal system. 3. develop professional, ethical graduates whose competence in problem-solving, legal analysis and application, quantitative reasoning, investigation and scientific laboratory procedures can be applied to immediate employment or advanced study.
24	MSCS -304-GE-E	Software Testing	2020	<ol style="list-style-type: none"> 1. Various test processes and continuous quality improvement, Types of errors and fault models. 2. Methods of test generation from requirements. 3. Behavior modeling using UML: Finite state machines (FSM), Test

				<p>generation from FSM models, Input space modeling using combinatorial designs.</p> <p>4. Combinatorial test generation, Test adequacy assessment using: control flow, data flow, and program mutations, The use of various test tools.</p> <p>5. Application of software testing techniques in commercial environments.</p>
25	MSCS -305 GE-A	Cloud Computing	2020	<p>1. Understand the concepts, characteristics, delivery models and benefits of cloud computing</p> <p>2. Understand the key security and compliance challenges of cloud computing</p> <p>3. Understand the key technical and organisational challenges</p> <p>4. Understand the different characteristics of public, private and hybrid cloud deployment models.</p>
26	MSCS -305 GE-B	Big Data Analytics	2020	<p>1. Understand Big Data and its analytics in the real world, Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics.</p>

				<ol style="list-style-type: none"> 2. Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm, Design and Implementation of Big Data Analytics using pig and spark to solve data intensive problems and to generate analytics. 3. Implement Big Data Activities using Hive.
27	MSCS -305 GE-C	Artificial Neural Networks	2020	<ol style="list-style-type: none"> 1. Know the main provisions neuro mathematics, Know the main types of neural networks; 2. Know and apply the methods of training neural networks; 3. Know the application of artificial neural networks; 4. To be able to formalize the problem, to solve it by using a neural network.
28	MSCS -305 GE-D	Cyber Security	2020	<ol style="list-style-type: none"> 1. Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure. 2. Design, develop, test and evaluate secure software. 3. Develop policies and procedures to manage enterprise security risks. 4. Evaluate and communicate the human role in security systems with an emphasis on ethics, social

				<p>engineering vulnerabilities and training.</p> <p>5. Interpret and forensically investigate security incidents.</p>
29	MSCS -305 GE-E	Mobile App Development	2020	<ol style="list-style-type: none"> 1. Describe those aspects of mobile programming that make it unique from programming for other platforms, 2. Critique mobile applications on their design pros and cons, 3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, 4. Program mobile applications for the Android operating system that use basic and advanced phone features, and 5. Deploy applications to the Android marketplace for distribution.

47. Commerce

M.Com (R)

S. No.	Course Cod	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship /Skill development
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	e			
1	101	Accounting Standards & Reporting	2020	<ul style="list-style-type: none"> i. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation ii. Impart the ability to find out the cash flows and provide the skills to value goodwill iii. Create awareness about IFRS and segment reporting
2	102.	Financial Management	2020	<ul style="list-style-type: none"> i. Describe meaning, functions and objectives; role of financial manager. ii. Examine investment decision, capital budgeting, techniques of CB and methods of CB. iii. Investigate management of working capital, needs and concepts. iv. Asses financing decision, capital structure and capital theories. v. Design dividend decision and theories of dividend.
3	103.	Business Environment and Policy	2020	<ul style="list-style-type: none"> i. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment. ii. Illustrates economic environment nature and scope and new economic policy. iii. Develop political, legal environment; reasons for state intervention and government business interface. iv. Study the socio cultural environment nature, impact of social responsibility and business ethics. v. Interpret global environment; benefits and problems of MNCs and WTO.

4	104.	Organisational Behaviour	2020	<ul style="list-style-type: none"> i. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation ii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts. iii. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.
5	105 a	Quantitative Techniques for Business Decisions	2020	<ul style="list-style-type: none"> i. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions. ii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions. iii. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.
7	201	Advanced cost Accounting	2020	<ul style="list-style-type: none"> i. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting; ii. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits. iii. Know the concept of equivalent production and accounting

				<p>treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets.</p> <p>iv. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial Markets and Services	2020	<p>i. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market.</p> <p>ii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>iii. Create plans and understand the metrics for getting finance from venture capital firms.</p>
9	203.	Strategic Financial Management	2020	<p>i. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>ii. Explain Strategic financial management success factors and constraints.</p> <p>iii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>iv. Identify financial distress and restructuring; countering financial distress.</p> <p>v. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate	2020	<p>i. Obtain knowledge on CG Mechanism and emerging issues in CG</p>

		Governance		<p>and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>ii. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>iii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>iv. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205 a	Working Capital Management	2020	<p>i. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>ii. To enables the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>iii. To provide the skills of inventory management with different techniques.</p>
12	206 a	e-Banking Operations	2020	<p>i. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>ii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>iii. Categorize the financial frauds in e-banking sector.</p>

13	301	Security Analysis and Portfolio Management	2020	<ul style="list-style-type: none"> i. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models. ii. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index. iii. Synthesize portfolio revision, need and strategies.
14	302.	Accounting for Managerial Decisions	2020	<ul style="list-style-type: none"> i. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing. ii. Study the concept of Responsibility Accounting and its uses and trends. iii. Know the essential parameters for evaluation of divisional performance and the emerging issues today iv. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.
15	303 a.	Tally with GST Application	2020	<ul style="list-style-type: none"> i. To acquaint oneself with skills to prepare financial statements through Tally ERP.

				<ul style="list-style-type: none"> ii. To understand basics of GST system and to know steps involved in generating GSTR reports. iii. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.
16	303 c.	Tax planning & Management	2020	<ul style="list-style-type: none"> i. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads ii. Acquire the knowledge on tax planning with regard to location iii. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.
18	305 a	Fundamentals of Accounting	2020	<ul style="list-style-type: none"> i. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts ii. To help the students to acquire the skills of financial statement analysis iii. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.
19	401	Financial Derivatives	2020	<ul style="list-style-type: none"> i. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions. ii. Prioritise options in financial derivatives and option pricing models. iii. Compose swap market futures, types and interest rate; pricing swaps. iv. Synthesize stock index futures, options and trading of stock futures and options.

20	402.	Project Planning & Control	2020	<ul style="list-style-type: none"> i. Define a project and operations of corporate long range planning and phases of capital budgeting. ii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting. iii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project. iv. Understand Social cost benefit analysis and methods of SCBA v. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.
21	403 a.	Insurance Management	2020	<ul style="list-style-type: none"> i. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector. ii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance. iii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon. iv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement. v. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.
23	405	Security	2020	<ul style="list-style-type: none"> i. Learn the basic concepts of Indian securities market.

	a	Market Operations		<p>ii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>iii. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>
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M.Com (A&F)

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship /Skill development
1	101	Accounting Standards & Reporting	2020	<p>iv. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation</p> <p>v. Impart the ability to find out the cash flows and provide the skills to value goodwill</p> <p>vi. Create awareness about IFRS and segment reporting</p>
2	102.	Financial Management	2020	<p>vi. Describe meaning, functions and objectives; role of financial manager.</p> <p>vii. Examine investment decision, capital budgeting, techniques of CB and methods of CB.</p> <p>viii. Investigate management of working capital, needs and concepts.</p> <p>ix. Asses financing decision, capital structure and capital theories.</p>

				x. Design dividend decision and theories of dividend.
3	103.	Business Environment and Policy	2020	<p>vi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment.</p> <p>vii. Illustrates economic environment nature and scope and new economic policy.</p> <p>viii. Develop political, legal environment; reasons for state intervention and government business interface.</p> <p>ix. Study the socio cultural environment nature, impact of social responsibility and business ethics.</p> <p>x. Interpret global environment; benefits and problems of MNCs and WTO.</p>
4	104.	Organisational Behaviour	2020	<p>iv. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation</p> <p>v. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts.</p> <p>vi. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.</p>
5	105	Quantitative	2020	iv. Appreciate the use of quantitative techniques, methods of business

	a	Techniques for Business Decisions		<p>forecasting and quantitative techniques in business decisions.</p> <p>v. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions.</p> <p>vi. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.</p>
7	201	Advanced cost Accounting	2020	<p>v. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting;</p> <p>vi. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits.</p> <p>vii. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets.</p> <p>viii. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial Markets and Services	2020	<p>iv. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market.</p> <p>v. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>vi. Create plans and understand the metrics for getting finance from venture capital firms.</p>

9	203.	Strategic Financial Management	2020	<p>vi. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>vii. Explain Strategic financial management success factors and constraints.</p> <p>viii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>ix. Identify financial distress and restructuring; countering financial distress.</p> <p>x. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2020	<p>v. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>vi. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>vii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>viii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205 a	Working Capital Management	2020	<p>iv. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>v. To enables the students familiarise with the cash management</p>

				<p>techniques and comprehend the concept of receivables and its management.</p> <p>vi. To provide the skills of inventory management with different techniques.</p>
12	206 a	e-Banking Operations	2020	<p>iv. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>v. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>vi. Categorize the financial frauds in e-banking sector.</p>
13	301	Security Analysis and Portfolio Management	2020	<p>iv. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models.</p> <p>v. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index.</p> <p>vi. Synthesize portfolio revision, need and strategies.</p>
14	302.	Accounting for Managerial Decisions	2020	<p>v. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term</p>

				<p>financing.</p> <p>vi. Study the concept of Responsibility Accounting and its uses and trends.</p> <p>vii. Know the essential parameters for evaluation of divisional performance and the emerging issues today</p> <p>viii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.</p>
15	303 a.	Tally with GST Application	2020	<p>iv. To acquaint oneself with skills to prepare financial statements through Tally ERP.</p> <p>v. To understand basics of GST system and to know steps involved in generating GSTR reports.</p> <p>vi. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.</p>
16	303 c.	Tax planning & Management	2020	<p>iv. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads</p> <p>v. Acquire the knowledge on tax planning with regard to location</p> <p>vi. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.</p>
18	305	Fundamentals	2020	<p>iv. To provide basic knowledge on accounting and its preparation and</p>

	a	of Accounting		<p>enable the students to prepare final accounts</p> <p>v. To help the students to acquire the skills of financial statement analysis</p> <p>vi. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.</p>
19	401	Financial Derivatives	2020	<p>v. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions.</p> <p>vi. Prioritise options in financial derivatives and option pricing models.</p> <p>vii. Compose swap market futures, types and interest rate; pricing swaps.</p> <p>viii. Synthesize stock index futures, options and trading of stock futures and options.</p>
20	402.	Project Planning & Control	2020	<p>vi. Define a project and operations of corporate long range planning and phases of capital budgeting.</p> <p>vii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>viii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>ix. Understand Social cost benefit analysis and methods of SCBA</p> <p>x. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403	Insurance	2020	<p>vi. Perceive the concept of RM, Socio-economic relevance, regulatory</p>

	a.	Management		<p>framework and latest development in Insurance sector.</p> <p>vii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>viii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon.</p> <p>ix. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>x. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
23	405 a	Security Market Operations	2020	<p>iv. Learn the basic concepts of Indian securities market.</p> <p>v. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>vi. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>

M.Com (FM)

S. No.	Course Cod	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship /Skill development
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	e			
1	101	Accounting Standards & Reporting	2020	<p>vii. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation</p> <p>viii. Impart the ability to find out the cash flows and provide the skills to value goodwill</p> <p>ix. Create awareness about IFRS and segment reporting</p>
2	102.	Financial Management	2020	<p>xi. Describe meaning, functions and objectives; role of financial manager.</p> <p>xii. Examine investment decision, capital budgeting, techniques of CB and methods of CB.</p> <p>xiii. Investigate management of working capital, needs and concepts.</p> <p>xiv. Asses financing decision, capital structure and capital theories.</p> <p>xv.Design dividend decision and theories of dividend.</p>
3	103.	Business Environment and Policy	2020	<p>xi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment.</p> <p>xii. Illustrates economic environment nature and scope and new economic policy.</p> <p>xiii. Develop political, legal environment; reasons for state intervention and government business interface.</p> <p>xiv. Study the socio cultural environment nature, impact of social responsibility and business ethics.</p> <p>xv. Interpret global environment; benefits and problems of MNCs and WTO.</p>
4	104.	Organisational Behaviour	2020	<p>vii. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality</p>

				<p>and motivation</p> <p>viii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts.</p> <p>ix. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.</p>
5	105 a	Quantitative Techniques for Business Decisions	2020	<p>vii. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions.</p> <p>viii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions.</p> <p>ix. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.</p>
7	201	Advanced cost Accounting	2020	<p>ix. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting;</p> <p>x. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits.</p> <p>xi. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets.</p>

				<p>xii. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial Markets and Services	2020	<p>vii. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market.</p> <p>viii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>ix. Create plans and understand the metrics for getting finance from venture capital firms.</p>
9	203.	Strategic Financial Management	2020	<p>xi. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>xii. Explain Strategic financial management success factors and constraints.</p> <p>xiii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>xiv. Identify financial distress and restructuring; countering financial distress.</p> <p>xv. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2020	<p>ix. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>x. Gain Knowledge on the historical backdrop of CG in India and the</p>

				<p>guidelines pronounced by various committees for effective practice in India.</p> <p>xi. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>xii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205 a	Working Capital Management	2020	<p>vii. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>viii. To enable the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>ix. To provide the skills of inventory management with different techniques.</p>
12	206 a	e-Banking Operations	2020	<p>vii. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>viii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>ix. Categorize the financial frauds in e-banking sector.</p>
13	301	Security Analysis and Portfolio	2020	<p>vii. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models.</p>

		Management		<p>viii. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index.</p> <p>ix. Synthesize portfolio revision, need and strategies.</p>
14	302.	Accounting for Managerial Decisions	2020	<p>ix. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing.</p> <p>x. Study the concept of Responsibility Accounting and its uses and trends.</p> <p>xi. Know the essential parameters for evaluation of divisional performance and the emerging issues today</p> <p>xii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.</p>
15	303 a.	Tally with GST Application	2020	<p>vii. To acquaint oneself with skills to prepare financial statements through Tally ERP.</p> <p>viii. To understand basics of GST system and to know steps involved in generating GSTR reports.</p> <p>ix. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.</p>

16	303 c.	Tax planning & Management	2020	<p>vii. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads</p> <p>viii. Acquire the knowledge on tax planning with regard to location</p> <p>ix. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.</p>
18	305 a	Fundamentals of Accounting	2020	<p>vii. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts</p> <p>viii. To help the students to acquire the skills of financial statement analysis</p> <p>ix. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.</p>
19	401	Financial Derivatives	2020	<p>ix. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions.</p> <p>x. Prioritise options in financial derivatives and option pricing models.</p> <p>xi. Compose swap market futures, types and interest rate; pricing swaps.</p> <p>xii. Synthesize stock index futures, options and trading of stock futures and options.</p>
20	402.	Project Planning & Control	2020	<p>xi. Define a project and operations of corporate long range planning and phases of capital budgeting.</p> <p>xii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>xiii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>xiv. Understand Social cost benefit analysis and methods of SCBA</p>

				<p>xv. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403 a.	Insurance Management	2020	<p>xi. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>xii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>xiii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon.</p> <p>xiv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>xv. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
23	405 a	Security Market Operations	2020	<p>vii. Learn the basic concepts of Indian securities market.</p> <p>viii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>ix. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensx and NSE indices.</p>

S.No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	BP101T	Human Anatomy and Physiology I– Theory	2020	<ol style="list-style-type: none"> 1. Know the fundamental knowledge on the structure and functions of the various systems of the human body. 2. understanding all the homeostatic mechanisms of the body 3. Understand the relationship of anatomy with various disciplines of pharmacy. 4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition
2	BP102T	Pharmaceutical Analysis I– Theory	2020	<ol style="list-style-type: none"> 1. It gives knowledge about the fundamental methodology to prepare different strength of solutions. 2. It facilitate the students to predict the sources of mistakes and errors. 3. It also helps to develop the

				<p>fundamentals of volumetric analytical skills.</p> <p>4. It provides the basic knowledge in the principles of electrochemical analytical techniques The student will be provided with the skills to improve by the course content in terms of analytical techniques to perform the estimation of different category drugs.</p>
3	BP104T	Pharmaceutical Inorganic Chemistry–Theory	2020	<p>1.To understand the history and concept of pharmacopoeia and its editions.</p> <p>2. Knowledge about the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals.</p> <p>3. Identification of limit tests of different pharmaceutical inorganic compounds.</p> <p>4. To understand the method to prepare inorganic pharmaceuticals.</p> <p>5. To justify the medicinal importance of</p>

				<p>acidifiers, antacids, cathartics and antimicrobial agents as gastrointestinal agents.</p> <p>6. To discuss the handling and applications of radiopharmaceuticals</p>
4	BP105T	Communication skills– Theory	2020	<ol style="list-style-type: none"> 1. To equip students with Pre-presentations and to understand the structure of a good presentation and devise various techniques for delivering a successful presentation. 2. To help students overcome stage fear and take questions. 3. To enable the students to become global citizens. 4. This course will prepare the young pharmacy student to interact effectively with doctors, nurses and other health workers. 5. At the end of the course the students

				will get the soft skills set to work cohesively with the team as a team player and addvalue to the pharmaceutical business.
5	BP106RBT	REMEDIAL BIOLOGY–Theory	2020	<ol style="list-style-type: none"> 1.know the kingdoms of life. 2.know the body fluids, absorption, digestion, respiration. 3.know the excretory products, neural control, chemical coordination, and human reproduction. 4.know the Nutrition in plants and photosynthesis. 5.know the respiration in plants, cell, and tissues.
6.	BP106RMT	Remedial Mathematics– Theory	2020	<ol style="list-style-type: none"> 1. This program shall create an awareness about the mathematical problems, to develop an statistical evaluation. 2. To adopt skills in identifying and

				<p>solving problems.</p> <p>3. Know the theory and their application in Pharmacy research</p> <p>4. Solve the different types of problems by applying theory in drug discovery</p>
7.	BP107P	Human Anatomy and Physiology – Practical	2020	<p>1. Differentiate the structures of the various systems of the human body.</p> <p>2. Perform the experiments like blood cell count, hemoglobin content, bleeding and clotting time and various physiological Parameters theoretically and practically.</p> <p>3. Identify the structural (microscopically and macroscopically) and functional details about different organ systems such as cardiovascular, lymphatic, digestive, muscular system</p>
8.	BP108P	Pharmaceutical Analysis I – Practical	2020	<p>1. This course is designed to perform and get trained to the electro chemical tests like potentiometry, complexometry, polarimetry.</p> <p>2. Hands on training on different titrations like complexometric titrations, precipitation titrations, redox titrations.</p> <p>3. Under stand the process of limit test and procedures.</p> <p>4. Gain knowledge on the determination of Normality, Molarity, Molality.</p> <p>5. Under stand the process how to</p>

				Prepare the solution and its standardization
9.	BP109P	Pharmaceutics I – Practical	2020	<p>1. This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts of preparing the different conventional dosage forms.</p> <p>2. To understand the different pharmaceutical calculation involved in formulation;</p> <p>3. Practical knowledge on formulation procedure of different dosage forms;</p> <p>4. Highlights the Practical allowance to formulate different types of dosage forms;and</p> <p>Gain Knowledge on criteria to appreciate the good formulation for effectiveness</p>
10.	BP110P	Pharmaceutical Inorganic Chemistry– Practical	2020	<p>1. To recall the sources of limit tests, preparation and identification of compounds.</p> <p>2. To demonstrate the preparation of inorganic pharmaceuticals</p> <p>3. To apply knowledge to perform modified limit tests.</p>

				<p>4. To analyze various inorganic pharmaceutical compounds.</p> <p>5. To select suitable method for the preparation of inorganic pharmaceuticals.</p> <p>6.To assess quality of inorganic pharmaceuticals.</p>
11	BP111P	Communication skills– Practical	2020	<p>1.To equip students with Pre-presentations and to understand the structure of a good presentation and devise various techniques for delivering a successful presentation.</p> <p>2.To help students overcome stage fear and take questions.</p> <p>3.To enable the students to become global citizens.</p> <p>4.This course will prepare the young pharmacy student to interact effectively with doctors, nurses and other health workers.</p>

				5. At the end of the course the students will get the soft skills set to work cohesively with the team as a team player and add value to the pharmaceutical business.
12	BP112RBP	Remedial biology – Practical	2020	<ol style="list-style-type: none"> 1. How to use microscope, section cutting, mounting, staining, and permanent slide preparation. 2. About the cell and its functions. 3. About the frog with respect to human. 4. About the bone and tissues in humans and plants. 5. About the blood groups, blood pressure and tidal volume
13	BP 201T	Human Anatomy and Physiology- II – Theory	2020	<ol style="list-style-type: none"> 1. Know the gross morphology, structure and functions of various organs of the human body. 2. Perform all the hematological tests with the help of specimens 3. Note all the points regarding the tissues various organs of human body 4. Brief knowledge on clinical significance of various systems in our

				body. 5. Application of the role of genetics in day to day life.
14	BP202T	Pharmaceutical Organic Chemistry I – Theory	2020	<ol style="list-style-type: none"> 1. Guess and write the structure, systematic/ trivial name, and pharmaceutical uses (if any) associated with the specified organic compounds. 2. Understand the general concept of isomerism and distinguish structural isomers. 3. Infer the chemical nature of the compounds on the basis of qualitative chemical tests. 4. Understand the significance of certain electronic effects with respect to the reactivity/ stability of organic compounds specified. 5. Understand and gain insight into the organic reactions by analyzing their fair reaction mechanisms.
15	BP203T	Biochemistry – Theory	2020	<ol style="list-style-type: none"> 1. Know the fundamental knowledge on the biochemical Pathways of the body 2. understanding the catalytic role of enzymes, importance of enzyme

				<p>inhibitors</p> <ol style="list-style-type: none"> 3. Understand the genetic organization of mammalian genome 4. Understand the DNA in the synthesis of RNAs and proteins
16	BP 204T	PATHOPHYSIOLOGYI–Theory	2020	<ol style="list-style-type: none"> 1. Identifies Name the signs, symptoms and complications of the diseases. 2. Students Get thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. 3. To Study the aetiology and pathogenesis of the selected disease states 4. The baseline knowledge required to practice medicine safely, confidently,

				rationally and effectively.
17	BP205T	Computer Applications in Pharmacy – Theory	2020	<ol style="list-style-type: none"> 1 know the various types of application of computers in pharmacy profession 2. know the various types of databases used in profession 3. know the usage of softwares in pharmacy
18	BP206T	Environmental Science– Theory	2020	<ol style="list-style-type: none"> 1. This program shall create an awareness about environmental problems, develop an attitude towards of concern for the environment. 2 To compare the natural, renewable and non-renewable resources and the problems associated with them. 3 To motivate the learners to participate in environment protection and improvement. 4 To analyze the concepts of eco system including structure and functions. 5 To adopt skills in identifying and solving environmental problems.

				6 To develop an attitude of concern for the environment.
19	BP207P	Human Anatomy And Physiology II – (Practical)	2020	<p>This subject is to inculcate the students about the structure and functioning of various systems and to perform hematological tests, body temperature and BMI.</p> <ol style="list-style-type: none"> 1. Prepare the charts and tables for easy understanding of various systems and positive & negative feed back mechanism. 2. Awareness on family planning devices and pregnancy diagnosis test. 3. Identify the structural (microscopically and macroscopically) and functional details about different organ systems such as cardiovascular, lymphatic, digestive, muscular system
20	BP208P	Pharmaceutical Organic Chemistry I - Practical	2020	<ol style="list-style-type: none"> 1. Assess the identity in terms of the physico-chemical properties of the compounds of specified chemical

				<p>classes.</p> <p>2. Get hands- on- experience in basic techniques of organic synthesis.</p>
21	BP209P	Biochemistry – Practical	2020	<p>1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch), Proteins (albumin and Casein)</p> <p>2. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)</p> <p>3. Qualitative analysis of urine for abnormal constituents</p> <p>4. Determination of blood creatinine, blood sugar, serum total cholesterol</p>
22	BP210P	Computer Applications in Pharmacy – Practical	2020	<p>1 know the various types of application of computers in pharmacy profession</p> <p>2. know the various types of databases used in profession</p> <p>3. know the usage of softwares in pharmacy</p>
23	BP 301 T	Pharmaceutical organic chemistry II (Theory)	2020	<p>1. Guess and writethestructure according to the stereochemical specifications.</p> <p>2. Fairly understand the aspects of heterocyclic chemistry in terms of naming and reactivity.</p> <p>3. Assess and understand the pharmaceutical applications and</p>

				importance of the specified named reactions
24	BP 302 T	Physical Pharmaceutics I (Theory)	2020	The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms
25	BP 303 T	Pharmaceutical Microbiology (Theory)	2020	<ol style="list-style-type: none"> 1. To acquire knowledge on HVAC systems, layout designs, GMP standards sanitation personal hygiene in sterile product manufacturing facilities. 2. To know the various types of sterile products with their formulation in large scale industries. 3. To develop skill for lab scale manufacture of few SVPs, LVPs, ophthalmic products with labelling and quality control.

26	BP 304 T	Pharmaceutical Engineering (Theory)	2020	<ol style="list-style-type: none"> 1. To know various unit operations involved in manufacturing of pharmaceuticals. 2. To understand the concepts of flow of fluids, size reduction and size separation. 3 To perform different mechanisms of heat transfer. 4 To compare and contrast different types of evaporation and distillation process. 5 To determine the factors influencing mixing, filtration and centrifugation. 6 To elaborate various preventive methods used for corrosion control in pharmaceutical industries
27	BP 305 P	Pharmaceutical organic chemistry II (Practical)	2020	<ol style="list-style-type: none"> 1. Assess the identity in terms of the physico-chemical properties of the compounds of specified chemical classes. 2. Get hands- on- experience in basic

				techniques of organic synthesis
28	BP 306 P	Physical Pharmaceutics I (Practical)	2020	This course helps to compare and evaluate the solubility of various combination compound modify for better solubility approaches by use different level of methods
29	BP 307 P	Pharmaceutical Microbiology (Practical)	2020	<ol style="list-style-type: none"> 1. Learners gain knowledge on some sterile marketed products along with blood products which are not possible in laboratory and large scale manufacture. 2. To know the skills of aseptic techniques principles of sterilization and validation of aseptic areas. 3. Knowledge on blood products and surgical dressing with their formulation details, production and quality control.
30	BP 308 P	Pharmaceutical Engineering (Practical)	2020	<ol style="list-style-type: none"> 1. To understand the basic principles involved in unit operations such as size reduction, size separation, distillation

				<p>and drying.</p> <p>2. To demonstrate and explain about the construction, working and applications of pharmaceutical equipment's such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer.</p> <p>3. To experiment with the process variables of filtration, evaporation and infer the same.</p> <p>4. To determine radiation constant of brass, iron, unpainted and painted glass.</p> <p>5. To determine overall heat transfer coefficient by heat exchanger and calculate the efficiency of steam distillation.</p> <p>6. To estimate moisture content, loss on drying and construct drying curves for calcium carbonate and starch</p>
31	BP 401 T	Pharmaceutical organic chemistry III (Theory)	2020	<p>1. Guess and writethestructure according to the stereochemical specifications.</p> <p>2. Fairly understand the aspects of heterocyclic chemistry in terms of</p>

				<p>naming and reactivity.</p> <p>3. Assess and understand the pharmaceutical applications and importance of the specified named reactions.</p>
32	BP 402 T	Medicinal chemistry I (Theory)	2020	<ol style="list-style-type: none"> 1. Fundamental knowledge on the structure, chemistry and therapeutic value of drugs. 2. Understand the Structural Activity Relationship (SAR) of drugs. 3. Importance of physicochemical properties and metabolism of drugs. 4. Chemical synthesis of important drugs under each class.

33	BP 403 T	Physical Pharmaceutics II (Theory)	2020	<ol style="list-style-type: none"> 1. The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. 2. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms
34	BP 404 T	Pharmacology I (Theory)	2020	<ol style="list-style-type: none"> 1. The subject is to impart knowledge about

				<p>the action of the drug, different routes of drug administration, toxic effects etc.</p> <ol style="list-style-type: none"> 2. Students would have understood the pharmacological actions of different categories of drugs. 3. Mechanism of drug action at organ system, sub cellular and macromolecular levels have been studied. 4. They have understood the application of basic pharmacological knowledge in the prevention and treatment of different diseases. 5. Signal transduction mechanism of various receptors have been understood
35	BP 405 T	PharmacognosyAndPhytochemistry I (Theory)	2020	<p>This subject is intended to impart students about the fundamental knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially, involved in the study of producing plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine.</p> <ol style="list-style-type: none"> 1. Significance of pharmacognostic parameters & study of crude drugs. 2. Understand the underlying reason of evolutionary significance of secondary metabolites production in plants & other organisms & deduce their significance as

				<p>medicinal molecules.</p> <p>3. How these primary metabolites are used comprehensively as a source to develop Pharmaceutical & industrial applications. Study about the source, name, chemical structures, methods of extraction, qualitative & quantitative analysis of glycosides & tannin.</p>
36	BP 406 P	Medicinal chemistry I (Practical)	2020	<p>This subject is to inculcate the students will able to know</p> <ol style="list-style-type: none"> 1. Basic knowledge on scope of Medicinal chemistry and interlinked subjects 2. Handling the glassware and Preparations of the synthetic drugs and how to calibrate the chemicals. 3. Perform the synthesis of the drugs with their chemical structures. 4. Compare the test drug with that of the standard drug by assay methods. 5. Understand the partition coefficient of any two drugs.
37	BP 407 P	Physical pharmaceutics II (Practical)	2020	<p>This course helps to compare and evaluate the solubility of various combination compound</p>

				modify for better solubility approaches by use different level of methods
38	BP 408 P	Pharmacology I (Practical)	2020	<ol style="list-style-type: none"> 1. Handling of different instruments used in Experimental Pharmacology. 2. Know about the different routes of drug administration, blood withdrawal etc., 3. Evaluate the different activities on animals. Demonstration of different simulation methods
39	BP 409 P	Pharmacognosy and Phytochemistry (Practical)	2020	<ol style="list-style-type: none"> 1. Demonstrate chemical tests to identify unorganized crude drugs 2. Evaluate the quality and purity of crude drugs 3. Perform linear measurements for crude drug identification
40	BP501T	MEDICINAL CHEMISTRY – II-Theory	2020	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activityrelationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.
41	BP502T.	Industrial Pharmacy-I- Theory	2020	Course enables the student to understand and

				appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product
41	BP503T.	PHARMACOLOGY-II- Theory	2020	This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.
42	BP504T.	PHARMACOGNOSY AND PHYTOCHEMISTRY II- Theory	2020	The main purpose of subject is to impart the students the knowledge of how these secondary metabolites is produced in the crude drugs, how to isolate and identify and produce them industrially. Also, this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine
43	BP505T	PHARMACEUTICAL JURISPRUDENCE- Theory	2020	This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.
44	BP506P.	Industrial Pharmacy-I- Practical	2020	This is help to understand the basic information of formulation process and how to optimise quality control solid, semisolid and parenteral dosage forms
45	BP507P		2020	1. Handling of different instruments used in

		PHARMACOLOGY-II- Practical		<p>Experimental Pharmacology.</p> <p>2.Know about the different routes of drug administration, blood withdrawal etc.</p> <p>3.Evaluate the different activities on animals.</p> <p>4.Demonstration of different simulation methods.</p> <p>They would have finally learnt to apply the knowledge of drugs practically using simulated pharmacological experiments.</p>
46	BP508P.	PHARMACOGNOSY AND PHYTOCHEMISTRY II - Practical	2020	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents by use chromatographic technique
47	BP601T.	MEDICINAL CHEMISTRY – III- Theory	2020	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure activity relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer aided drug design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs

48	BP602T.	PHARMACOLOGY-III- Theory	2020	This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition, emphasis on the principles of toxicology and chrono pharmacology.
49	BP603T.	HERBAL DRUG TECHNOLOGY- Theory	2020	This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs
50	BP604T.	BIOPHARMACEUTICS AND PHARMACOKINETICS- Theory	2020	This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems raised therein
51	BP605T.	PHARMACEUTICAL BIOTECHNOLOGY - Theory	2020	Biotechnology has a long promise to revolutionize the biological sciences and technology. Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting.

				Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs. Biotechnology has already produced transgenic crops and animals and the future promises lot more. It is basically a research-based subject.
52	BP606T.	PHARMACEUTICAL QUALITY ASSURANCE- Theory	2020	This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs
53	BP607P.	MEDICINAL CHEMISTRY- III- Practical	2020	This course helps to how to separation and identification compound given unknown mixture. It imparts take it knowledge on crude separation and identification technique
54	BP608 P.	PHARMACOLOGY-III- Practical	2020	1. Handling of different instruments used in Experimental Pharmacology. 2. Know about the different routes of drug administration, blood withdrawal etc., 3. Evaluate the different activities on animals. 4. Demonstration of different simulation methods. 5. They would have finally learnt to apply the knowledge of drugs practically using simulated pharmacological experiments
55	BP609P.	HERBAL DRUG TECHNOLOGY-	2020	This subject gives the student the knowledge

		- Practical		of basic understanding of herbal drug formulation and determination of herbal content
56	BP701T	Instrumental Methods of Analysis (Theory)	2020	<ol style="list-style-type: none"> 1) To understand selected instrumental analytical techniques (spectroscopic and chromatographic methods) and differentiate with volumetric analysis. 2) To gain knowledge on interaction of EMR with matter and to build the analytical understanding at the level of atom, group and molecular structure of organic and inorganic compounds with different functional groups and their applications in pharmacy. 3) To maximize knowledge on characterization and estimation of ions by spectroscopical techniques 4) To simplify affinity of matter with stationary phase and mobile phase, physical and chemical. This subject is

				intended to impart students about the fundamental knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially, involved in the study of producing plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine.
57	BP702T	Industrial Pharmacy II (Theory)	2020	<ol style="list-style-type: none"> 1. This course is designed to impart knowledge and skills necessary to train the students to be on par with the routine of Industrial activities in Production. 2. On completion of this course, it is expected that students will be able to understand. 3. Handle the scheduled activities in pharmaceutical firm. Manage the production of large batches of pharmaceuticals.

				formulations
58	BP703T	Pharmacy Practice (Theory)	2020	<p>1. Understand the elements of pharmaceutical care and provide comprehensive patient care services</p> <p>2. Interpret the laboratory results to aid the clinical diagnosis of various disorders.</p> <p>Provide integrated, critically analysed medicine and poison information to enable healthcare professionals in the efficient patient management</p>
59	BP704T	Novel Drug Delivery System (Theory)	2020	<p>1. This subject is designed to impart basic knowledge on the area of novel drug delivery systems. Upon completion of the course student shall be able</p> <p>2. To understand various approaches for development of novel drug delivery systems.</p> <p>3. To understand the criteria for selection of drugs and polymers for the development of</p>

				Novel drug delivery systems, their formulation and evaluation
60	BP705P	Instrumental Methods of Analysis (Practical)	2020	<ol style="list-style-type: none"> 1. Discusses the effect of impurities on the quality of drugs and behavioural pattern of drugs 2. Aids in understanding the SOP and usage of software associated with various analytical instruments 3. Helps in gaining knowledge of interpretation of spectra and of chromatograms
61	BP706PS	Practice School	2020	<ol style="list-style-type: none"> 1. Work in team and undertake a project in the area of Pharmacy 2. Present, exhibit and document the project work • Develop a project report 3. Apply concepts of pharmaceutical sciences for executing the project 4. Apply appropriate research methodology while formulating a project 5. Define specifications, synthesize, analyse,

				develop and evaluate a project
62	BP801T	Biostatistics and Research Methodology (Theory)	2020	<ol style="list-style-type: none"> 1. Develop the ability to apply the methods while working on a research project work 2. Describe the appropriate statistical methods required for a particular research design 3. Choose the appropriate research design and develop appropriate research hypothesis for a research project 4. Develop a appropriate framework for research studies
63	BP802T	Social and Preventive Pharmacy (Theory)	2020	<ol style="list-style-type: none"> 1. After the successful completion of this course, the student shall be able to: Acquire high consciousness/ realization of current issues related to health and pharmaceutical problems within the country and worldwide. 2. Have a critical way of thinking based on current healthcare development. <p>Evaluate alternative ways of solving problems related to health and</p>

				pharmaceutical issues
64	BPH 409	Biopharmaceutics & Pharmacokinetics Practicals	2020	<ol style="list-style-type: none"> 1. Compare the in-vitro drug release profile of different marketed products 2. Perform the solubility enhancement techniques for improvement of drug release of poorly water-soluble drugs 3. Estimate the bioavailability (absolute and relative) and bioequivalence from the given clinical data 4. Calculate the drug content in blood sample using Area Under Curve approach 5. Calculate and interpret various pharmacokinetic parameters from the given clinical data
65	BP803ET	Pharma Marketing Management (Theory)	2020	
66	BP804ET	Pharmaceutical Regulatory Science (Theory)	2020	<ol style="list-style-type: none"> 1. Explain the process of drug discovery, development and generic product development 2. Describe the regulatory approval process and registration procedures for API and drug products. 3. Basic understanding of regulations of India

				<p>with other global regulated markets</p> <ol style="list-style-type: none"> 4. Understand the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 5. Learn the basic understanding the importance of orange book, Federal Register, Code of Federal Regulatory, and purple book
67	BP805ET	Pharmacovigilance (Theory)	2020	<ol style="list-style-type: none"> 1. Explain the regulatory requirements for conducting clinical trial 2. Describe in detail about various types of clinical trial designs 3. Explain the responsibilities of key players involved in clinical trials 4. Describe the documentary requirements for Clinical trials 5. Explain Adverse drug reaction and its management

68	BP806ET	Quality Control and Standardization of Herbals (Theory)	2020	<ol style="list-style-type: none"> 1. Explain basic tests for drugs to obtain dosage form for pharmaceutical substances and medicinal plants 2. Explain methods for evaluation of pharmaceutical substances, medicinal plants and commercial crude drugs. 3. Describe guidelines for cGMP, GAP, GMP and GLP for quality assurance of herbal drugs in industry 4. Describe guidelines for quality control of herbal drugs and evaluation of safety and efficacy of herbal medicines. 5. Explain regulatory approval process and their registration in Indian and international markets.
69	BP807ET	Computer Aided Drug Design (Theory)	2020	<ol style="list-style-type: none"> 1. Explain the various stages of drug discovery and learn the concept of bioisosterism.

				<ol style="list-style-type: none"> 2. Describe physicochemical Properties and the techniques involved in QSAR 3. Explain various structure-based drug design methods (Molecular docking, Denovo drug design) 4. Learn the concept of pharmacophore and modelling techniques 5. Explain the various techniques in Virtual Screening
70	BP808ET	Cell and Molecular Biology (Theory)	2020	<ol style="list-style-type: none"> 1. It deals with understanding the molecular aspects of the biology. 2. It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription. 3. It also helps in understanding the concepts of cellular function 4. It deals with understanding the molecular aspects of the biology. It majorly

				<p>emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription.</p> <p>It also helps in understanding the concepts of cellular function</p>
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	BP809ET	<p style="text-align: center;">Cosmetic Science (Theory)</p>	2020	<ol style="list-style-type: none"> 1. Cosmetic Science is an interdisciplinary applied science program providing students with the opportunities to develop professional skills and fundamental concepts driving cosmetic science. 2. Cosmetic Science focuses on the needs of the cosmetic industry and its consumers, in addition to providing students with the critical and evaluative skills to become professional scientists. 3. Cosmetic Science covers a range of sciences, both pure and applied, formulation development and industry operations, all of which give you a broad range of career opportunities.
	BP810ET	<p style="text-align: center;">Experimental Pharmacology (Theory)</p>	2020	<ol style="list-style-type: none"> 1. Study of commonly used instruments in experimental pharmacology. 2. Introduction to CPCSEA guidelines

				<p>and OECD guidelines.</p> <ol style="list-style-type: none"> 3. Introduction to animal physiology with their biochemical reference values in various animal species. 4. Study of methods for collection of blood, body fluids and urine from experimental animals. 5. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).
	BP811ET	Advanced Instrumentation Techniques (Theory)	2020	<ol style="list-style-type: none"> 1. Apply the analytical techniques to study bulk-drug pharmaceuticals, quality control. 2. Develop in-depth knowledge and critical awareness of the application of modern. 3. Know preparation and standardization

				<p>of various concentrations of acids and bases.</p> <p>4. Understand the basic concepts involved in electro-analytical techniques and its types.</p> <p>5. Understand theory, principle, types and techniques of coulometric titration</p>
	BP812ET	Dietary Supplements and Nutraceuticals (Theory)	2020	<p>1. Know different Acts and guidelines that regulate Drugs & Cosmetics, Medical Devices, Biologicals & Herbals, and Food & Nutraceuticals industry in India.</p> <p>2. Understand the approval process and regulatory requirements.</p> <p>3. Drugs & Cosmetics, Medical Devices, Biologicals & Herbals, and Food & Nutraceuticals</p>
	BP813PW	Project Work	2020	<p>6. Work in team and undertake a project in the area of Pharmacy</p>

				<p>7. Apply concepts of pharmaceutical sciences for executing the project</p> <p>8. Apply appropriate research methodology while formulating a project</p> <p>9. Define specifications, synthesize, analyse, develop and evaluate a project</p> <p>10. Present, exhibit and document the project work • Develop a project report</p>

46. M.Pharmacy

S.No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	MPH	General & Systemic	2020	6. Describe the instruments in

	101A(Pharmacology)	Pharmacology		<p>experimental pharmacology.</p> <ol style="list-style-type: none"> 7. Know CPCSEA guidelines and OECD guidelines. 8. Know animal physiology with their biochemical reference values in various animal species. 9. Do collection of blood, body fluids and urine from experimental animals. 10. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).
2	MPH 102A(Pharmacology)	Clinical Pharmacology & Toxicology	2020	<ol style="list-style-type: none"> 1. The pathophysiology of selected disease states and the rationale for drug therapy. 2. The controversies in drug therapy. 3. The importance of preparation of individualized therapeutic plans based on diagnosis. 4. Understanding the concepts of Clinical research; Therapeutic drug monitoring (TDM) ; concepts of Pharmacotherapeutics, Management & Current Good Clinical Practice of various diseases. 5. Studying of various types, mechanisms

				ms of Drug interaction; rational for drug combinations; Drug Toxicity and its prevention; Adverse drug reactions and its monitoring
3	MPH 103	Practical 1	2020	<ol style="list-style-type: none"> 1. Recording of concentration response curve (CRC) of acetylcholine 2. Record of the CRC of 5-HT on rat fundus preparation. 3. Record of the CRC of histamine on guinea pig ileum 4. Inotropic and chronotropic effects of drugs on isolated frog heart
4	MPH 104	Practical-II(MAT)	2020	<ol style="list-style-type: none"> 1. Explains the importance of modern instrumentation in pharmaceutical analysis 2. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental

				techniques for the analysis of drugs in bulk or in various dosage forms
5	MPH 105	Modern Analytical Techniques and biostatics Theory	2020	<ol style="list-style-type: none"> 1. Explains the importance of modern instrumentation in pharmaceutical analysis 2. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms. <p>Explains the concepts of Statistics and their applications in pharmacy</p>
6.	MPH 106	Human Values and Professional Ethics-I	2020	<ol style="list-style-type: none"> 1. Awareness of ethical issues and basic ethical approaches. 2. Improved writing skills and understanding of ethical conflict. 3. Enables students to develop ability for moral reasoning and act with ethical deliberations. 4. After studying ethics one is equipped with the ethical sensitivity and moral

				<p>understanding required to solve complex ethical dilemmas.</p> <p>5. Learn how to live peacefully</p>
7.	MPH 107	Comprehensive Viva	2020	<p>1. Know the fundamental knowledge on the structure and functions of the various systems of the human body.</p> <p>2. understanding all the homeostatic mechanisms of the body</p> <p>3. Understand the relationship of anatomy with various disciplines of pharmacy.</p> <p>4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition</p>
8.	MPH 201A (Pharmacology)	Molecular Pharmacology	2020	<p>1. Explain the modes of action of drug at the cellular level by describing their interactions with target proteins</p> <p>2. Explain the receptor signal transduction processes.</p> <p>3. Explain the molecular pathways affected by drugs.</p> <p>4. Understanding the applicability of</p>

				<p>molecular pharmacology and biomarkers in drug discovery process.</p> <p>5. Outline the molecular features that are responsible for agonist and antagonist binding, and coupling to effector processes, with reference to the nicotinic, muscarinic, and β-adrenergic receptors</p>
9.	MPH 202 A	Methods in Drug Evaluation	2020	<ol style="list-style-type: none"> 1. Know the commonly used instruments in experimental pharmacology. 2. describe the animal physiology with their biochemical reference values in various animal species. 3. Study of methods for collection of blood, body fluids and urine from experimental animals. 4. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).
10.	MPH 203	Practical 1	2020	<ol style="list-style-type: none"> 1. Calculation of the PA_2 Calculate the PA_2 Value 2. Interpolation bioassay

				<ul style="list-style-type: none"> 3. Matching or bracketing bioassay 4. Three point bioassay 5. Four point bioassay
11	MPH 204	Practical-II(BPK)	2020	<ul style="list-style-type: none"> 1. Compare and differentiate between compartmental and non compartmental analysis 2. Identify the physiological, Physicochemical and dosage form related factors that affects drug absorption from different dosage forms 3. Examine the absolute and relative bioavailability of drugs form different dosage forms using either plasma or urine data. 4. Compare the bioequivalence of two drug prodcts
12	MPH 205	BIO-PHARMACEUTICS&	2020	<ul style="list-style-type: none"> 1. Understand the concept of ADME of drug in human body. 2. Determine the various pharmacokinetic parameters from

		PHARMACOKINETICS		either plasma concentration or urinary excretion data for drug 3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule
13	MPH 206	Human Values and Professional Ethics-II	2020	<ol style="list-style-type: none"> 1. Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field 2. Learn about morals, values & work ethics. 3. Develop commitment 4. Learn about the different professional roles. 5. Ethical, social and environmental awareness 6. Professional rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct
14	MPH 207	Comprehensive Viva	2020	
15	MPH 301	Mid-Term Evaluation of Research project	2020	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar

				<p>presentation, submission of a thesis, and a public demonstration of work undertaken.</p> <p>4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups.</p> <p>5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.</p>
16	MPH 401	Project thesis submission & presentation and Project Viva voce	2020	<p>1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree.</p> <p>2. Projects offer the opportunity to apply and extend material learned throughout the program.</p> <p>3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken.</p> <p>4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups.</p> <p>5. This necessarily introduces the</p>

				dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.
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M. Pharmacy (Pharmaceutics)

S.No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	MPH 101B	ADVANCED PHARMACEUTICAL TECHNOLOGY	2020	<ol style="list-style-type: none"> 1. Course designed to impart advanced knowledge and skills required to learn various aspects and concepts at pharmaceutical industries. 2. The Active Pharmaceutical Ingredients and Generic drug Product 3. The elements of Preformulation studies, Objectives Upon completion

				<p>of the course, student shall be able to understand Optimization Techniques.</p> <p>4. Industrial Management and GMP Considerations, development & Stability Testing, sterilization process, Pilot Plant Scale Up Techniques & packaging of dosage forms</p>
2	<p>MPH 102B(Pharmaceutics)</p>	<p>Advanced Pharmaceutics</p>	2020	<p>1. Upon completion of this program the student will have fundamental knowledge in preparing conventional dosage forms, pharmaceutical calculation involved in formulation and appreciate the importance of good formulation for effectiveness.</p> <p>2. The need, concept, design and evaluation of various customized, sustained and controlled release dosage forms using solubility studies and basic theories of dissolution.</p> <p>3. To formulate and evaluate various novel drug delivery systems based on the molecular weight</p>

				determination of polymers and its stability studies.
3	MPH 103	Practical-I(PHARMACEUTICS)	2020	<ol style="list-style-type: none"> 1. The passage of drugs, biopharmaceutical parameters. 2. How to do dissolution studies for the dosage forms to know the bioavailability of the drugs. 3. Solubility studies for the drugs based on its pH and its applications in the formulations of drug delivery systems. 4. To determine the molecular weight of the polymers. 5. Gives an fundamental knowledge on the stability studies
4	MPH 104	Practical-II(MAT)	2020	<ol style="list-style-type: none"> 5. Explains the importance of modern instrumentation in pharmaceutical analysis 6. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 7. Discusses the principle and applications of chromatographic techniques 8. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage form
5	MPH 105	Modern Analytical	2020	<ol style="list-style-type: none"> 5. Explains the importance of modern

		Techniques and biostatics Theory		<p>instrumentation in pharmaceutical analysis</p> <p>6. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV-Visible, IR, FTIR.</p> <p>7. Discusses the principle and applications of chromatographic techniques</p> <p>8. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms.</p> <p>9. Explains the concepts of Statistics and their applications in pharmacy</p>
6.	MPH 106	Human Values and Professional Ethics-I	2020	<p>6. Awareness of ethical issues and basic ethical approaches.</p> <p>7. Improved writing skills and understanding of ethical conflict.</p> <p>8. Enables students to develop ability for moral reasoning and act with ethical deliberations.</p> <p>9. After studying ethics one is equipped with the ethical sensitivity and moral understanding required to solve complex ethical dilemmas.</p> <p>10. Learn how to live peacefully</p>
7.	MPH 107	Comprehensive Viva	2020	
8.	MPH 201B (Pharmaceutics)	INDUSTRIAL PHARMACY	2020	1. The elements of preformulation studies.

				<ol style="list-style-type: none"> 2. Acquire skill in preparation of different types of tablets. 3. Acquire knowledge for evaluation of various dosage forms. 4. Acquire the knowledge of processing of dosage form on large scale that suit pharma industry
9.	MPH202B(Pharmaceutics)	PROCESS VALIDATION & CGMP	2020	<ol style="list-style-type: none"> 1. Acquire knowledge on various quality assurance systems, processes and current regulatory guidelines related to manufacturing and distribution. 2. Address quality issues and provide solutions needed to attain Quality leadership in an environment of continual improvement. 3. Understand the importance of effective documentation. 4. To prepare professionally competent individuals with Quality concept being engrained to achieve global quality standards in pharmaceutical industries
10.	MPH 203	Practical-I	2020	<ol style="list-style-type: none"> 1. Gain knowledge and acquire skills to prepare different types of tablets. 2. Highlights the handling of different equipment's for the preparation and evaluation of various dosage forms
11	MPH 204	Practical-II(BPT)	2020	<ol style="list-style-type: none"> 5. Compare and differentiate between

				<p>compartmental and non compartmental analysis</p> <p>6. Identify the physiological, Physicochemical and dosage form related factors that affects drug absorption from different dosage forms</p> <p>7. Examine the absolute and relative bioavailability of drugs form different dosage forms using either plasma or urine data.</p> <p>8. Compare the bioequivalence of two drug prodcts</p>
12	MPH 205	BIO- PHARMACEUTICS & PHARMACOKINETICS	2020	<p>1. Understand the concept of ADME of drug in human body.</p> <p>2. Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug</p> <p>3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule</p>
13	MPH 206	Human Values and	2020	7. Identify and analyze an ethical issue

		Professional Ethics-II		<p>in the subject matter under investigation or in a relevant field</p> <p>8. Learn about morals, values & work ethics.</p> <p>9. Develop commitment</p> <p>10. Learn about the different professional roles.</p> <p>11. Ethical, social and environmental awareness</p> <p>12. Professional rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct</p>
14	MPH 207	Comprehensive Viva	2020	
15	MPH 301	Mid-Term Evaluation of Research project	2020	<p>1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree.</p> <p>2. Projects offer the opportunity to apply and extend material learned throughout the program.</p> <p>3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken.</p> <p>4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually</p>

				<p>or in small groups.</p> <p>5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.</p>
16	MPH 401	Project thesis submission & presentation and Project Viva voce	2020	<p>1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree.</p> <p>2. Projects offer the opportunity to apply and extend material learned throughout the program.</p> <p>3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken.</p> <p>4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups.</p> <p>5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.</p>

S.V.U.COLLEGE OF ENGINEERING

Chemical Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA 101	MATHEMATICS –I	2020	<ol style="list-style-type: none">1. analyze differential equations and solve them2. apply differential equations to engineering problems.3. Use transformation to convert one type into another type presumably easier to solve.4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients.5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform.6. expand functions as power series using Maclaurin's and Talor's series7. optimize the problems related to OR, Computer science, Probability and Statistics8. draw an approximate shape by the

				<p>study of some of its important characteristics such as symmetry, tangents, regions enclosing curve tracing method to find length, area, volume.</p> <p>9. use multiple integral in evaluating area and volume of any region bounded by the given curves.</p>
2	CY102	Chemistry for Chemical Engg.-1	2020	<ol style="list-style-type: none"> 1. analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. 2. rationalize bulk properties and processes using thermodynamic considerations. 3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques 4. rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. 5. list major chemical reactions that are used in the synthesis of molecules.

3	EN103	English	2020	<ol style="list-style-type: none"> 1. learn the elements of grammar and composition of English Language. 2. Learn literary texts such as Short stories and prose passages. 3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation. 4. develop communication skills by cultivating the habit of reading comprehension passages. 5. develop the language skills like listening, speaking, reading and writing. <p>Make use of self-instructed learner friendly modes of language learning through competence</p>
4	EE104	Basic Electrical and Electronics Engineering	2020	<ol style="list-style-type: none"> 1. understand the basic concepts of D.C. single phase and 3- phase supply and circuits and solve basic electrical circuit problems 2. understand the basic concepts of transformers and motors used as various industrial drives 3. understand the concept of power factor improvement for industrial installations and concepts of most economical power factor

				4. understand the operation and characteristics of diodes, transistors, integrated circuits and digital circuits.
5	ME105	Engineering Graphics and Design	2020	<ol style="list-style-type: none"> 1. make a distinction between first angle projection and third angle projection of drawing. 2 draw hyperbola, parabola, Involutives and Cycloidal curves. 3. draw sections of solids including cylinders, cones, prisms and pyramids. 4. draw projections of lines, planes, solids and sections of solids. <p>draw orthographic projections of lines, planes, and solids.</p>
6	EN106	English Communication Lab	2020	<ol style="list-style-type: none"> 1. use ranks of matrices to decide whether the system of linear equations is consistent or not 2. use Cayley-Hamilton theorem to find inverses or powers of matrices. 3. use Eigen values and vectors to reduce Quadratic forms to normal form. 4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector

				<p>and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. use Green's theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. use Stokes' theorem to give a physical interpretation of the curl of a vector field</p> <p>7. use the divergence theorem to give a physical interpretation of the divergence of a vector field.</p> <p>8. find the Fourier Series to represent a function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic phenomenon.</p> <p>9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions.</p> <p>10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena.</p>
7	MA	Mathematics - II	2020	1. use ranks of matrices to decide

	201		<p>whether the system of linear equations is consistent or not</p> <ol style="list-style-type: none">2. use Cayley-Hamilton theorem to find inverses or powers of matrices.3. use Eigen values and vectors to reduce Quadratic forms to normal form.4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.5. use Green's theorem to evaluate line integrals along simple closed contours on the plane6. use Stokes' theorem to give a physical interpretation of the curl of a vector field7. use the divergence theorem to give a physical interpretation of the divergence of a vector field.8. find the Fourier Series to represent a function as a series of constants times sine and cosine functions of different
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				<p>frequencies in order to observe periodic phenomenon.</p> <p>9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions.</p> <p>10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena.</p>
8	PY 202	Engineering Physics	2020	<ol style="list-style-type: none"> 1. Develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses 2. understand the quantum mechanics and ultimately the quantum behavior of charged particles when they are in motion. 3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems 4. apply the basic principles of Mechanics of rigid body and continuous media and their applications understand the principles in electrostatics and

				<p>electromagnetics and magnetic properties of materials.</p> <p>5. understand size depended properties of nano-dimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices.</p> <p>6. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.</p> <p>7. Learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.</p> <p>8. provide multidisciplinary experiences throughout the curriculum.</p>
9	CS 203	Program for Problem Solving	2020	<p>1. Develop and test programs in C and correct syntax and logical errors.</p> <p>2. Implement conditional branching, iteration and recursion.</p> <p>3. Decompose a problem into functions and synthesize a complete program.</p> <p>4. Use arrays, pointers, strings and</p>

				<p>structures to formulate algorithms and programs</p> <p>5. Use files to perform read and write operations.</p> <p>6. Handle programming assignments based on class, abstraction, encapsulation, overloading and inheritance.</p>
10	CY 204	Chemistry for Chemical Engg.-II	2020	<ol style="list-style-type: none"> 1. apply the basic knowledge of force system. 2. know the types of supports occur in civil engineering structures 3. know the geometrical properties of different cross sections. 4. understand different types of stresses and strains, elastic constants. 5. understand the behavior of different internal forces under different types of loading.
11	ME 205	Workshop/Manufacturing Practices	2020	<p>Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.</p>
12	CS 206	Program for Problem Solving Lab	2020	<ol style="list-style-type: none"> 1. Develop the C code for the given algorithm. 2. Understand, debug and trace the

				execution of programs written in C language.
13	CE 207	Environmental Science	2020	<p>1. acquire knowledge in</p> <ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> diverse components of environment and natural resources <input type="checkbox"/> <input type="checkbox"/> ecosystem and biodiversity & its conservation methods <input type="checkbox"/> <input type="checkbox"/> population growth and human health <input type="checkbox"/> <input type="checkbox"/> green technology <p>2. identify and resolve the issues related to sources of different types of pollutions</p> <p>3. provide solutions to individuals, industries and government for sustainable development of natural resources</p> <p>4. apply environmental ethics in protection of diversified ecosystems.</p>
14	MA301 B	Mathematics - III	2020	<p>Applying various statistical models and methods for drawing conclusions and making decisions under uncertainty in engineering contexts</p> <p>2</p> <p>Apply statistical and numerical methods in various computer science related projects, seminars and research</p>

				<p>3 Apply the knowledge of iterative methods to solve algebraic and transcendental equations, simultaneous linear equations, ODE (ordinary differential equations)</p> <p>4 Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration</p> <p>5 Demonstrate a basic knowledge of the techniques for accurate and efficient solution of models based on linear and nonlinear systems of equations, ordinary differential equations and partial differential equations.</p>
15	CH302 E	Engineering and Solid Mechanics	2020	<p>1. Learn about the elastic and plastic behavior of material and evaluate stress invariants, principal stresses and their directions.</p> <p>2. Euler's Axioms, Free Body Diagrams, Dynamics of point mass models of bodies.</p> <p>3. Shear Force and Bending Moment</p> <p>4. Principal Moments of Inertia,</p>

				<p>Moment of momentum relations for rigid bodies, Euler's Equations of Motion.</p> <p>5. Concept of strain, strain displacement relations, compatibility conditions, Uniaxial stress and strain analysis of bars.</p>
16	HS303 C	Managerial Economics and Accountancy	2020	<p>Understand Macro Economic environment of the business and its impact on enterprise.</p> <p>Identify various cost elements of the product and its effect on decision making.</p> <p>Understand the concepts of financial management and smart investment. Prepare the Accounting records and interpret the data for Managerial Decisions.</p>
17	CH304 C	Chemical Process Calculations	2020	<p>1. To understand the dimension-unit systems and their inter relationships, to be able to represent mixture compositions in different forms and to be able to make calculations using reaction stoichiometry.</p> <p>2. To be able to make mass balance calculations for different operations, without</p>

				<p>reaction, its mathematical form and its application to different operations and reactions.</p> <p>3. To be able to make mass balance calculations for different operations, with reaction , its mathematical form and its application to different operations and reactions.</p> <p>4. To have learnt the significance of vapor pressure and its dependence and to have learnt different representations of partial saturation and to apply ideal gas law in conjunction with variation in levels of saturation.</p> <p>5. To be able to estimate parameters like oxygen requirement, flue gas analysis, energy released and flame temperatures.</p>
18	CH305 C	Momentum Transfer	2020	<p>1. To be able to perform dimensional analysis of fluid flow problems and develop pressure drop equations for fluid static equipments in which fluid is at rest.</p> <p>2. To have the knowledge on different types of flow regions in fluid flow, rheological properties of fluids, turbulence and</p>

				<p>boundary layers.</p> <p>3. To be able to carry out macroscopic mass, momentum and energy balance to solve engineering problems related to fluid flow and to analyze flow past solid surface, through packed bed and in fluidized beds.</p> <p>4. Determine the minimum fluidization velocity and terminal velocity of the fluid in Stokes and Newton's law regions.</p> <p>5. The analysis of fluid flow measuring devices like Orifice meter, Venturimeter, Rotameter and Pitot tube, the construction and working of Centrifugal and reciprocating pumps. And also give the knowledge on different types of valve, selection of pipe and fittings.</p>
19	CH306 C	Chemical Engineering Thermodynamics - I	2020	<p>1. To have learnt the fundamental ideas about energy, equilibrium and reversibility. To be able to apply first law to estimate heat and work effects in closed, open and flow systems.</p> <p>2. To understand PV and PT phase diagrams, ideal gas law and its</p>

				<p>applications. To be able to estimate heat and work effects for different processes – isothermal, isobaric, isometric, and adiabatic processes.</p> <p>3. To be to apply second law of thermodynamics to estimate efficiency of a cycle. To have understood the concept of entropy and its estimation.</p> <p>4. To have learnt different refrigeration cycles and also to be able to calculate their COP.</p> <p>5. To have learnt the thermodynamic analysis of flow processes.</p>
20	CH307 L	Momentum Transfer Lab	2020	<p>a) The study and use of MS WORD, MS EXCEL , POWER POINT AND Google Forms with their utilization in Chemical engineering project works and personal works</p>
21	MC310 A	Constitution of India	2020	<p>a) Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.</p> <p>b) Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution</p>

				<p>in India.</p> <p>c) Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. Discuss the passage of the Hindu Code Bill of 1956.</p>
22	CH401 B	Mathematics - IV	2020	<ol style="list-style-type: none"> 1. After the completion of course, students will be able to apply numerical methods to solve all type of equations. 2. Derive interpolating polynomials using interpolation formulae. 3. Solve integral equations numerically. 4. Analyse the data and develop skills to solve Algebraic & Transcendental Equations. 5. Derive numerical methods solution of differential equations. To find the Solution of Linear And Non-Linear Algebraic Equations.
23	CH402 C	Particle and Fluid Processing	2020	<ol style="list-style-type: none"> 1. To be able to determine the Volume surface mean diameter,

				<p>mass mean diameter, number of particles and types of mixers.</p> <p>2. To have the knowledge of different types of Crushers, grinders, ultrafine grinders, cutters, to be able to find the power requirement using three crushing laws.</p> <p>3. To be able to calculate the screening effectiveness .To have understood settling processes and flotation technique.</p> <p>4. To develop the rate equations for constant pressure and constant volume filtration techniques and also to solve the problems related to these techniques.To have acquired the construction and operation of different filtration, settling and clarifying equipment.</p> <p>5. To understand the functioning of agitated vessels and to calculate the power consumption.To have the knowledge on different types of turbines, blending and mixing.</p>
24	CH403 C	Chemical Engineering Thermodynamics - II	2020	<p>1.To be able to develop and use expressions for property estimation. To be able to calculate</p>

				<p>property values from equations of state.</p> <p>2. To have learnt the concepts of residual, excess, partial molar properties and property changes of mixing. To have understood concepts of ideal solutions, fugacity and activity coefficient.</p> <p>3. To be able to use modified forms of Raoult's law for non-ideal systems, Dewpoint and bubble point calculations.</p> <p>4. To be able to make phase equilibrium calculations using Raoult's law. To have learnt the concepts of LLE and VLLE.</p> <p>5. To have learnt the concept of equilibrium constant and its calculation. To be able to estimate equilibrium conversion of single and simple multiple reactions.</p>
25	CH404 C	Heat Transfer	2020	<p>1. To be able to calculate the heat transfer flux in one-dimensional heat conduction .To have learnt the concepts of turbulence, boundary layer and analogies.</p> <p>2. To have understood the construction and flow patterns in</p>

				<p>heat exchange equipment.</p> <p>3. To be able to calculate heat flux in natural convection. To be able to estimate heat flux in forced convection.</p> <p>4. To have understood the concepts of black body, view factors and to be able to calculate radiation heat flux. To be able to handle conduction-convection conduction-convectionradiation heat transfer.</p> <p>5. To be able to design heat exchangers and condensers. To have understood the functioning of evaporators.</p>
26	CH405 C	Mass Transfer Operations - I	2020	<p>1. To be able to calculate the flux in cases involving diffusive transfer. To appreciate the contribution of turbulence to transfer and to calculate coefficients and from them, the flux.</p> <p>2. To be able to differentiate different representations of resistances and to properly integrate them to obtain the overall resistance. To be able to estimate the process parameters like solvent requirement, number of</p>

				<p>theoretical stages, height and diameter of columns.</p> <p>3. To understand equilibrium relevant to absorption and to calculate the number of stages, number and height of transfer units.</p> <p>4. To understand the equilibrium concerned to humidification, various methods of conducting the operation and to design a cooling tower.</p> <p>5. To understand the mechanism of drying operation and to calculate the time of drying.</p>
27	CH406 C	Chemical Technology	2020	<p>1. Able to differentiate unit operations and unit processes. To Know the basic principles of different unit operations. Able to know constituents of petroleum, and the extraction of petroleum compounds petrol, diesel</p> <p>2. Can understand the raw materials and production of Ammonia, Urea, Phosphorus industries.</p> <p>3. Can understand the raw materials, pulp and paper industry, reactions involved and the production of sugar, starch.</p>

				<p>4. Get knowledge about alcohol, soaps, edible oils, hydrogenation of oils and extraction of vegetable oils.</p> <p>5. Can understand the difference between paints and varnishes and about the production.</p> <p>Know the classification of plastics, industrial production of plastics and rubbers.</p>
28	CH409 S	Python Programming	2020	<p>a) Understand the structure, syntax, and semantics of the Python language.</p> <p>b) Interpret the concepts of Object-Oriented Programming as used in Python.</p> <p>c) Demonstrate proficiency in handling Strings and File Systems.</p> <p>d) Implement desktop/Web-based applications using the Python programming language.</p> <p>e) Boost hireability through innovative and independent learning.</p>

Chemical Engineering M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CHPC 01	Mathematics & Statistical	2020	1. Students should be able to solve

		Methods in Chemical Engineering		<p>system of linear algebraic equations</p> <p>2. Students should be able to do numerical integrations of functions.</p> <p>3. Students should be able to fit relationship between two data sets using linear, non-linear regression.</p> <p>4. Students should be able to calculate maxima/minima and functions</p>
2	CHPC 02	Advanced Transport Phenomena	2020	<p>1. Understand the mechanism of momentum, heat and mass transport for steady and unsteady flow.</p> <p>2. Perform momentum, energy and mass balances for a given system at macroscopic and microscopic scale.</p> <p>3. Solve the governing equations to obtain velocity, temperature and concentration profiles.</p> <p>4. Model the momentum, heat and mass transport under turbulent conditions.</p> <p>5. Develop analogies among momentum, energy and mass transport.</p>
3	CHPE 11	Process Design & Synthesis	2020	<p>1. Analyze alternative processes and equipment</p>

				<p>2. Synthesize a chemical process flow sheet that would approximate the real process</p> <p>3. Design best process flow sheet for a given product</p> <p>4. Perform economic analysis related to process design and evaluate project profitability</p>
4	CHPE 12	Chemical Reactor Analysis	2020	<p>1. Evaluate heterogeneous reactor performance considering mass transfer limitations</p> <p>2. Perform the energy balance and obtain concentration profiles in multiphase reactors.</p> <p>3. Estimate the performance of multiphase reactors under non-isothermal conditions</p>
5	CHPE 13	Fluidization Engineering	2020	<p>1. Performing and understanding the behavior fluidization in fluidized bed</p> <p>2. Evaluate the characterization of particles and power consumption in fluidization regimes</p> <p>3. Understanding the applicability of the fluidized beds in chemical industries</p>
6	CHPE 14	Process Plant Simulation	2020	<p>1) Modeling Aspects and Classification of Mathematical Modeling</p> <p>2) How to Prepare Models from Mass</p>

				<p>Transfer and Models on Heat Transfer</p> <p>3) How to Prepare Models from Fluid Flow and Models on Reaction Engineering</p> <p>4) The analysis through Propagation of Errors, Error Methods, Data Regression Methods and Process Simulation</p> <p>5) Decomposition of Networks and Convergence Promotion</p>
7	CHPE 21	Industrial Pollution Control	2020	<ol style="list-style-type: none"> 1. Recognize the causes and effects of environmental pollution 2. Analyze the mechanism of proliferation of pollution 3. Develop methods for pollution abatement and waste minimization 4. Design treatment methods for gas, liquid and solid wastes
8	CHPE 22	Applications of Nanotechnology in Chemical Engineering	2020	<ol style="list-style-type: none"> 1. Understanding the different top down and bottom up approaches for nanoparticles 2. Get to know the different applications of nanoparticles in chemical engineering field. 3. Learning the characterization techniques for nanoparticles
9	CHPE 23	Chemo-informatics	2020	<ol style="list-style-type: none"> 1. The course will introduce the students preparing for professional

				<p>work in chemistry must learn how to retrieve specific information from the enormous and rapidly expanding chemical literature.</p> <p>2. The course will provide a broad overview of the computer technology to chemistry in all of its manifestations.</p> <p>3. The course will expose the student to current and relevant applications in QSAR and Drug Design.</p>
10	CHPE 24	Advanced Control Systems	2020	<p>1) Feed Forward, Ratio Controls and Advanced Controllers</p> <p>2) Control Loop Interactions & Optimization</p> <p>3) Digital Computer Control, selection of sampling period, comparison of analog and digital filters</p> <p>4) Finite Difference Models, Z-Transforms, Pulse Transfer Functions</p> <p>5) Samples and Data Control Systems</p>
11	CHPP 01	Computational Techniques Lab	2020	<p>1. Use numerical methods for various manipulations and be capable of implementing them on a computing system</p>
12	PGPA 14	Value Education	2020	<p>1. Knowledge of self-development</p>

				<p>2.Learn the importance of Human values</p> <p>3.Developing the overall personality</p>
13	CHPC 03	Separation Techniques	2020	<p>1) Applies the concepts of diffusion mass transfer, mass transfer coefficients, convective mass transfer, inter-phase mass transfer, equipment for gas-liquid operations</p> <p>2) Suggest and design equipment for various mass transfer operations</p> <p>3) Study of the stage wise mass transfer operations, principles of various stage wise contact processes like distillation</p> <p>4) Student will be able to select a separation process for a particular system.</p> <p>5) Able to understand the energy requirements of separation processes</p>
14	CHPC 04	Chemical Reactor Theory	2020	<p>1) learn the importance of RTD and Non-ideal flow in reacting vessels.</p> <p>2) Calculate the conversions based on segregated flow model, dispersion model and tanks-in-series models.</p> <p>3) Understand the diffusion and reaction in a porous catalyst.</p> <p>4) Learn the factors influencing catalyst decay, the role of pore</p>

				diffusion on catalyst activity rate. 5) Understand the design of heterogeneous catalytic reactors.
15	CHPE 31	Modern Concepts in Catalysis & Surface Phenomenon	2020	1. To understand the concepts of homogenous and heterogeneous catalysis, with specific examples. 2. To study reaction mechanisms and kinetics of homogenous and heterogeneous catalytic reactions. 3. To familiarize with the characterization of catalysts 4. To understand the application and mechanisms of several types of catalysts in chemical industry.
16	CHPE 32	Advanced Downstream Processing	2020	1. To learn effective strategies of downstream processing in chemical industry. 2. Understand the role of downstream processing. 3. Analyze reactors, upstream and downstream processes in production
17	CHPE 33	Computational Fluid Dynamics	2020	1. Understand the basic principles of mathematics and numerical concepts of fluid dynamics.

				<p>2. Develop governing equations for a given fluid flow system.</p> <p>3. Adapt finite difference techniques for fluid flow models.</p> <p>4. Apply finite difference method for heat transfer problems.</p> <p>5. Solve computational fluid flow problems using finite volume techniques.</p> <p>6. Get familiarized to modern CFD software used for the analysis of complex fluid-flow systems</p>
18	CHPE 34	Enzyme Science & Engineering	2020	<p>1) Know the mechanisms of Chemical and Enzyme Catalysts</p> <p>2) Develop, understand and apply Kinetic Models</p> <p>3) Formulate and Analyze Immobilized Enzyme Kinetics</p> <p>4) Design and analyze Enzyme Reactors</p> <p>5) Gain knowledge on Applications of Enzyme and on Biosensors</p>
19	CHPE 35	Optimization Theory & Practice	2020	<p>1) formulate and analyse the optimization of the given physical situation.</p> <p>2) Apply different methods of optimization and to suggest a technique for specific problem</p>

				<p>3) Understand the difference between constrained and unconstrained optimization</p> <p>4) Understand the importance of linear programming problems</p> <p>5) Realize the importance of optimization by understanding different examples</p>
20	CHPE 36	Micro and Nano Fluidics	2020	<p>1. Introduce students to the physical principles to analyze fluid flow in micro and nano-size devices. It unifies the thermal sciences with electrostatics, electrokinetics, colloid science; electrochemistry; and molecular biology.</p>
21	CHPE 37	Process Intensification	2020	<p>1. Assess the values and limitations of process intensification, cleaner technologies and waste minimization options.</p> <p>2. Measure and monitor the usage of raw materials and wastes generating from production and frame the strategies for reduction, reuse and recycle.</p> <p>3. Obtain alternative solutions ensuring a more sustainable future based on environmental protection, economic viability and</p>

				<p>social acceptance.</p> <p>4. Analyze data, observe trends and relate this to other variables.</p> <p>5. Plan for research in new energy systems, materials and process intensification.</p>
22	CHPE 41	Phase Transitions in Process Equipment	2020	<p>1. The student is expected to obtain considerable insight into various types of phase transitions, and how these can be described theoretically in different ways</p> <p>2. Predict relationships between physical quantities using the laws and methods of thermodynamics.</p> <p>3. Find probabilities and thermal quantities (free energy, entropy, etc) given the energy eigen values of a system.</p> <p>4. The student is expected to obtain considerable insight into various types of phase transitions, and how these can be described theoretically in different ways</p> <p>5. Predict relationships between physical quantities using the laws and methods of</p>

				thermodynamics. 6. Find probabilities and thermal quantities (free energy, entropy, etc) given the energy eigen values of a system.
23	CHPE42	Process Integration	2020	1. Maximum heat recovery for a given process (both new processes, and retrofit of existing processes) identify opportunities for integration of high-efficiency energy. 2. Energy-intensive thermal separation operations (distillation, evaporation) at an industrial process site. 3. Evaluate the process integration measures with respect to energy efficiency, greenhouse gas emissions and economic performance.
24	CHPE 43	Transport in Porous Media	2020	1. Students will understand the mechanisms involved in transport processes in porous media and will be able to work with the equations that govern the fate and transport of gas, water and solutes in porous media.
25	CHPE 44	Microflow Chemistry & Process Technology	2020	1. Students will understand the role of micro flow chemistry and process technology in

				<p>chemical engineering.</p> <p>2. The student is expected to obtain considerable insight into various types of micro reactors.</p>
26	CHPE 45	Process Plant Design & Flow sheeting Tools	2020	<p>1. Analyze, synthesize and design processes for manufacturing products commercially</p> <p>2. Integrate and apply techniques and knowledge acquired in other courses such as thermodynamics, heat and mass transfer, fluid mechanics, instrumentation and control to design heat exchangers, plate and packed columns and engineering flow diagrams</p> <p>3. Use commercial flow sheeting software to simulate processes and design process equipment</p> <p>4. Recognize economic, construction, safety, operability and other design constraints</p> <p>5. Estimate fixed and working capitals and operating costs for process plants</p>
27	CHPE 46	Process Synthesis & Analysis	2020	<p>1) understand the concepts of Engineering economics</p>

				<p>2) Able to estimate various costs involved in a process industry and evaluate the tax burden of an establishment</p> <p>3) Able to estimate profitability of a company</p> <p>4) Understand the heat exchanger networks and their importance in industry</p> <p>5) Compute break even period for an investment and rate of return</p>
28	CHPE 47	Membrane Separations	2020	<p>1) Knowledge on Preparation and Characterization of Materials and Types of Membrane</p> <p>2) Knowledge on Nano-Filtration, Ultra-Filtration and Micro-Filtration</p> <p>3) Knowledge on Designing Reverse Osmosis and Dialysis</p> <p>4) Concepts of Gas Separation and Pervaporation and Design of Pervaporation Module</p> <p>5) Knowledge on Ion Exchange Membrane Process, Liquid Membranes and Other Membrane Processes</p>
29	CHPP 02	Advanced Chem. Engg. Lab	2020	1. to design and perform Chemical Engineering related experiments
30	PGPA 21	Constitution of India	2020	1. Discuss the growth of the demand for civil rights in India for the bulk of

				<p>Indians before the arrival of Gandhi in Indian politics.</p> <p>2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</p> <p>3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</p> <p>4. Discuss the passage of the Hindu Code Bill of 1956</p>
31	PGPA 22	Pedagogy Studies	2020	<p>1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</p> <p>2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</p> <p>3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support</p>

				effective pedagogy?
32	PGPA 23	Stress Management by Yoga	2020	<ol style="list-style-type: none"> 1. Develop healthy mind in a healthy body thus improving social health also 2. Improve efficiency
33	PGPA 24	Personality Development through Life Enhancement Skills	2020	<ol style="list-style-type: none"> 1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life 2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity 3. Study of Neetishatakam will help in developing versatile personality of students.
34	CHPE 51	Design of Experiments & Parameter Estimation	2020	<ol style="list-style-type: none"> 1. Plan experiments for a critical comparison of outputs 2. Include statistical approach to propose hypothesis from experimental data 3. Implement factorial and randomized sampling from experiments 4. Estimate parameters by multi-dimensional optimization
35	CHPE 52	Computer Aided Design	2020	<ol style="list-style-type: none"> 1. Students get the knowledge about computer Aided Flow Sheet Synthesis 2. Computer aided equipment design

				of Evaporators; Distillation columns; Reactors, adsorption columns.
36	CHPE 53	Cleaner Production	2020	<ol style="list-style-type: none"> 1. Explain the concept and principles of cleaner production. 2. Suggest different unit operations in industrial production process to minimize pollutions. 3. Plan good housekeeping practices for Industry/other places with concern of safety, hygiene and waste reduction. 4. Suggest basic methods and techniques of pollution prevention during production. 5. Suggest cleaner production methods for a given situation which will also lead to cost reduction in long run
37	CHPE 54	Fuel Cell Systems	2020	<ol style="list-style-type: none"> 1) Classify Fuel Cells, and understand factors affecting efficiency of electrochemical energy 2) Construct, operate AFC & MCFC 3) Gain knowledge on manufacturing and materials, environmental impacts and applications of PAFC & SOFC 4) Gain knowledge on electrode-oxidation of methanol and crossover

				to DMF and Engineering Aspects 5) Gain knowledge on Technological and Economical Challenges on PEMFC
38	CHPE 56	Bioprocess Engineering	2020	<ol style="list-style-type: none"> 1. Understand the different cells and their use in biochemical processes. 2. Understand the role of enzymes in kinetic analysis of biochemical reaction. 3. Analyze bioreactors, upstream and downstream processes in production of bio-products 4. Demonstrate the fermentation process and its products for the latest industrial revolution
39	PGOP 11	Business Analytics	2020	<ol style="list-style-type: none"> 1. Students will demonstrate knowledge of data analytics. 2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics. 3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. Students will demonstrate the ability to translate data into clear,

				actionable insights
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Civil Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA101	Mathematics–I	2020	<ol style="list-style-type: none"> 1. analyzedifferential equationsandsolve them 2. applydifferential equationstoengineering problems. 3. Usestransformation toconvert onetype intoanother typepresumably easierto solve. 4. useshifttheoremstocomputetheLaplacetransform,inverseLaplace transformandthe solutions of second order, linear equations with constant coefficients. 5. solvean initial value problem for an n^{th} orderordinarydifferential equation using theLaplace transform. 6. expandfunctionsaspowerseriesusingMaclaurin’sandTalor’s series 7. optimizetheproblemsrelatedtoOR,Computerscience,Probabilit yand Statistics 8. drawanapproximateshapebythestudyofsomeofitsimportant characteristicssuchas symmetry, tangents, regions enclosing curve tracing method to find length, area, volume. 9. usemultipleintegralinevaluatingareaandvolumeofanyregion boundedbythegiven curves.
2	CY101	Engg. Chemistry	2020	<ol style="list-style-type: none"> 1. analyze microscopic chemistry in terms of atomic and

				<ul style="list-style-type: none"> molecular orbitals and intermolecular forces. 2. rationalize bulk properties and processes using thermodynamic considerations. 3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques 4. rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. 5. list major chemical reactions that are used in the synthesis of molecules.
3	EN103	English	2020	<ul style="list-style-type: none"> 1. learn the elements of grammar and composition of English Language. 2. Learn literary texts such as Short stories and prose passages. 3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation. 4. develop communication skills by cultivating the habit of reading comprehension passages. 5. develop the language skills like listening, speaking, reading and writing. 6. Make use of self-instructed learner friendly modes of language learning through competence.
4	EE104	Basic Electrical & Electronics Engineering	2020	<ul style="list-style-type: none"> 1. understand the basic concepts of D.C. single phase and 3- phase supply and circuits and solve basic electrical circuit problems 2. understand the basic concepts of transformers and motors used as various industrial drives

				<p>3. understand the concept of power factor improvement for industrial installations and concepts of most economical power factor</p> <p>4. understand the operation and characteristics of diodes, transistors, integrated circuits and digital circuits</p>
5	ME105	Engineering Graphics and Design	2020	<p>1. make a distinction between first angle projection and third angle projection of drawing.</p> <p>2. draw hyperbola, parabola, Involutives and Cycloidal curves.</p> <p>3. draw sections of solids including cylinders, cones, prisms and pyramids.</p> <p>4. draw projections of lines, planes, solids and sections of solids.</p> <p>5. draw orthographic projections of lines, planes, and solids.</p>
6	EN 106	English Communication Lab	2020	The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
7	MA201	Mathematics–II	2020	<p>1. use ranks of matrices to decide whether the system of linear equations is consistent or not</p> <p>2. use Cayley-Hamilton theorem to find inverses or powers of matrices.</p> <p>3. use Eigen values and vectors to reduce Quadratic forms to normal form.</p> <p>4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. use Green's theorem to evaluate line integrals along simple closed contours on the plane</p>

				<p>6. use Stokes' theorem to give a physical interpretation of the curl of a vector field</p> <p>7. use the divergence theorem to give a physical interpretation of the divergence of a vector field.</p> <p>8. find the Fourier Series to represent a function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic phenomenon.</p> <p>9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions.</p> <p>10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena.</p>
8	PY202	Engineering Physics	2020	<p>1. Develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses</p> <p>2. understand the quantum mechanics and ultimately the quantum behavior of charged particles when they are in motion.</p> <p>3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems</p> <p>4. apply the basic principles of Mechanics of rigid body and continuous media and their applications understand the principles in electrostatics and electromagnetics and magnetic properties of materials.</p>

				<p>5. understand size depended properties of nano-dimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices.</p> <p>6. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.</p> <p>7. Learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.</p> <p>8. provide multidisciplinary experiences throughout the curriculum.</p>
9	CS203	Programming for Problem Solving	2020	<p>1. Develop and test programs in C and correct syntax and logical errors.</p> <p>2. Implement conditional branching, iteration and recursion.</p> <p>3. Decompose a problem into functions and synthesize a complete program.</p> <p>4. Use arrays, pointers, strings and structures to formulate algorithms and programs</p> <p>5. Use files to perform read and write operations.</p> <p>6. Handle programming assignments based on class, abstraction, encapsulation, overloading and inheritance.</p>
10	CE 204	Engineering Mechanics	2020	<p>1. apply the basic knowledge of force system.</p> <p>2. know the types of supports occur in civil engineering structures</p> <p>3. know the geometrical properties of different cross sections.</p> <p>4. understand different types of stresses and strains, elastic constants.</p>

				5. understand the behavior of different internal forces under different types of loading.
11	ME205	Workshop / Manufacturing Practices	2020	Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.
12	CS206	Programming for Problem Solving Lab	2020	1. Develop the C code for the given algorithm. 2. Understand, debug and trace the execution of programs written in C language.
13	CE 207	Environmental Science	2020	1. acquire knowledge in <input type="checkbox"/> <input type="checkbox"/> diverse components of environment and natural resources <input type="checkbox"/> <input type="checkbox"/> ecosystem and biodiversity & its conservation methods <input type="checkbox"/> <input type="checkbox"/> population growth and human health <input type="checkbox"/> <input type="checkbox"/> green technology 2. identify and resolve the issues related to sources of different types of pollutions 3. provide solutions to individuals, industries and government for sustainable development of natural resources 4. apply environmental ethics in protection of diversified ecosystems.
14	MA301 B	Mathematics – III(<i>Common to all branches</i>)	2020	1. Solve field problems in engineering involving PDEs. 2. Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
15	CE302C	Strength of Materials	2020	1) Develop shear force and bending moment diagrams for different load cases. 2) Compute the flexural stresses for different load cases and

				different cross-sections.
16	HS303C	Managerial Economics and Accountancy <i>(Common to all branches)</i>	2020	<ol style="list-style-type: none"> 1. Understand Macro Economic environment of the business and its impact on enterprise. 2. Identify various cost elements of the product and its effect on decision making. 3. Understand the concepts of financial management and smart investment. 4. Prepare the Accounting records and interpret the data for Managerial Decisions.
17	CE304C	Surveying	2020	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Identify data collection methods and prepare field notes. <input type="checkbox"/> <input type="checkbox"/> Measure and layout elevations and relative position of points, understand plans and field notes. <input type="checkbox"/> <input type="checkbox"/> Ability to design, set out curves and use modern equipment. <input type="checkbox"/> <input type="checkbox"/> Calculate angles, distances, levels, estimate measurement errors and apply corrections. <input type="checkbox"/> <input type="checkbox"/> Interpret survey data and compute areas and volumes.
18	CE305C	Building Materials and Construction Technology	2020	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Explain the manufacturing, physical and mechanical properties of various construction materials and their testing procedures. <input type="checkbox"/> <input type="checkbox"/> Describe the basic building components. <input type="checkbox"/> <input type="checkbox"/> Apply the methods to be followed in constructing various components of a building.
19	CE306C	Engineering Geology	2020	<ol style="list-style-type: none"> 1. To apply the geological knowledge to Civil Engineering Constructions, at different stages. The kind of study exposes the geological draw backs, if any. 2. To help the site engineers to take suitable precautionary measures to overcome the drawbacks but also to

				take advantage of the site geology findings wherever possible. 3. To take precautionary measures in civil engineering constructions based on geological parameters.
20	CE 307P	Surveying Lab	2020	1. Ability to use the techniques, skill and surveying equipment for engineering practice. 2. Ability to apply mathematics concepts in the field of surveying. 3. Ability to develop an understanding of modern surveying equipment
21	CE 308P	Materials Testing Lab	2020	1. Determine the properties of different building construction materials. 2. Analyse the behaviour of different construction materials.
22	CE309S	Computer Skills	2020	1. Use MS WORD, MS EXCEL AND POWER POINT in any civil engineering project works and for personal works.
23	MC310 A	Constitution of India(<i>Common to all branches</i>)	2020	1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. Discuss the passage of the Hindu Code Bill of 1956.
24	MA401 C	Probability & Statistics (<i>Common to all branches</i>)	2020	● evaluate approximating the roots of polynomial and transcendental equations by different algorithms

				<ul style="list-style-type: none"> ● Apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations ● apply discrete and continuous probability distributions ● design the components of a classical hypothesis test infer the statistical inferential methods based on small and large sampling tests
25	CE402C	Concrete Technology and Construction Equipment	2020	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Understand various ingredients of concrete and their role. <input type="checkbox"/> <input type="checkbox"/> Examine knowledge on the fresh and hardened properties of concrete. <input type="checkbox"/> <input type="checkbox"/> Design concrete mixes using various methods. <input type="checkbox"/> <input type="checkbox"/> Perceive special concretes for accomplishing performance levels.
26	CE403C	Fluid Mechanics and Hydraulic Machines	2020	<ol style="list-style-type: none"> 1. Able to solve fluid flow problems using fundamental principles 2. Able to apply the knowledge of fluid flow concepts and fundamental equations for solving problems 3. Able to measure pressure, velocity and discharge, and apply the knowledge of impacts of jets related to real life problems. 4. Able to analyze the flow problems in laminar and turbulent flow conditions. 5. Able to analyze the characteristics of turbines and pumps.
27	CE404C	Structural Analysis	2020	<ul style="list-style-type: none"> ● Understand various engineering properties of materials ● Estimate magnitudes under combined loads in members and structures ● Determine shear stresses for different cross-sections. ● Determine deflection at any point on a beam under simple or combined loads ● Apply failure criteria to implement in design of structural

				<p>members.</p> <ul style="list-style-type: none"> Analyze members under torsion, combined torsion and bending moment for determination of energy absorption
28	CE405C	Environmental Engineering -1	2020	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Able to estimate the water demand of any area and understand the water sources and its quality <input type="checkbox"/> <input type="checkbox"/> Able to solve the distribution network problems <input type="checkbox"/> <input type="checkbox"/> Able to explain the water quality parameters <input type="checkbox"/> <input type="checkbox"/> Able to plan and design water treatment plant <input type="checkbox"/> <input type="checkbox"/> Able to understand advanced water treatment technologies
29	CE406C	Soil Mechanics	2020	<ul style="list-style-type: none"> Identify and classify various soils based on their characteristics. Compute effective stress under different conditions Evaluate permeability and seepage of soils. Understand consolidation in soils and Calculate consolidation time and settlement of soils. Understand shear strength theories and Determine Shear Characteristics of soils
30	CE407P	Fluid Mechanics and Hydraulic Machines Lab	2020	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Able to calibrate the flow measuring devices. <input type="checkbox"/> <input type="checkbox"/> Able to calculate loss coefficients for use in the pipe flow analysis. <input type="checkbox"/> <input type="checkbox"/> Able to prepare the characteristic curves of the pumps.
31	CE408P	Soil Mechanics Lab	2020	<ol style="list-style-type: none"> 1. Depict the procedures for measuring the engineering properties of soils. 2. Describe the procedure for measuring the basic properties and compaction characteristics of soils. 3. Assess the soil for engineering applications
32	CE409S	Python Programming	2020	<ol style="list-style-type: none"> 1. Apply the OOP principles and best practices of python programming.

				<ol style="list-style-type: none"> 2. Write clear and effective pythonic code. 3. Create applications using python programming. 4. Implementing databases using SQLite and Access databases using python programming. 5. Understand and feel comfortable in working with web application frameworks. 6. Develop APIs required for the web applications using web frameworks like Flask and Fast AP
33	CE410P	Computer Aided Building Drawing	2020	<ul style="list-style-type: none"> ● Develop drawing skills for effective demonstration of building details. ● Draw building plans using Computer Aided Design and Drafting soft wares. ● Develop engineering project drawings incorporating details and design parameters in 2D. ● Examine efficacy of AUTOCAD design and Drawing.

Civil Engineering SE M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SEPC01	Advanced Structural Analysis	2020	<ol style="list-style-type: none"> 1. Analysis the structures due to the effects of settlements and temperature changes. 2. Analyze the skeleton structures using stiffness analysis code. 3. Use direct stiffness method understanding its limitations 4. Study the fundamentals of FEM
2	SEPC02	Advanced Solid Mechanics	2020	<ol style="list-style-type: none"> 1. Solve simple problems of elasticity and plasticity understanding the basic concepts.

				<ol style="list-style-type: none"> 2. Apply numerical methods to solve continuum problems. 3. Study the two-dimensional problems of Elasticity. 4. Solving the tensional problem of prismatic beam. 5. Solve the problems of plasticity understanding the basic concepts.
3	SEPE11	Theory of Thin Plates and Shells	2020	<ol style="list-style-type: none"> 1. Use analytical methods for the solution of thin plates and shells. 2. Use analytical methods for the solution of shells. 3. Apply the numerical techniques and tools for the complex problems in thin plates. 4. Apply the numerical techniques and tools for the complex problems in shells.
4	SEPE22	Structural Health Monitoring	2020	<ol style="list-style-type: none"> 1. Diagnosis the distress in the structure understanding the causes and factors. 2. Assess the health of structure using static field methods. 3. Assess the health of structure using dynamic field tests. 4. Suggest repairs and rehabilitation measures of the structure.
5	SECP01	Structural Design Lab	2020	<ol style="list-style-type: none"> 1. Design and Detail all the Structural Components of Frame Buildings. 2. Design and Detail complete Multi-Storey Frame Buildings.
6	SECP02	Advanced Solid Mechanics Lab	2020	<ol style="list-style-type: none"> 1. Design high grade concrete and study the parameters affecting its performance. 2. Conduct Non Destructive Tests on existing concrete structures.

				3. Apply engineering principles to understand behavior of structural/ elements.
7	PGPA12	Disaster Management	2020	<ol style="list-style-type: none"> 1. demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. 2. critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. 3. develop the standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.
8	PGPC41	Research Methodology and IPR	2020	<ol style="list-style-type: none"> 1. Understand research problem formulation. 2. Analyze research related information 3. Follow research ethics 4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5. Understand that when IPR would take such important place in growth of individuals & Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.

				6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
9	SEPC03	FEM in Structural Engineering	2020	<ol style="list-style-type: none"> 1. Use Finite Element Method for structural analysis. 2. Execute the Finite Element Program/ Software. 3. Solve continuum problems using finite element analysis. 4. Develop the FEM software.
10	SEPC04	Structural Dynamics	2020	<ol style="list-style-type: none"> 1. Analyze and study dynamics response of single degree freedom system using fundamental theory and equation of motion. 2. Analyze and study dynamics response of Multi degree freedom system with lumped parameter using fundamental theory and equation of motion. 3. Analyze and study dynamics response of Multi degree freedom system with distributed mass and load. 4. Study the concepts of dynamic effects due to wind loading, moving loading & vibrations caused by Traffic, Blasting & Pile driving. 5. Use the available software for dynamic analysis.
11	SEPE33	Design of High Rise Structures	2020	<ol style="list-style-type: none"> 1. Analyse, design and detail Transmission/ TV tower, Mast and Trestles with different loading conditions. 2. Analyse, design and detail the RC and Steel Chimney. 3. Analyse. design and detail the tall buildings subjected to different loading conditions using

				<p>relevant codes.</p> <p>4. Analysis and design of dynamic approach OF STRUCTURAL DESIGN USING is Code provisions.</p>
12	SEPE41	Design of Advanced Concrete Structures	2020	<ol style="list-style-type: none"> 1. Model the loads and findings the material properties. 2. Design deep beams and corbels 3. Design of shear walls using IS, ACI & Errocode. 4. Analyse the special structures by understanding their behaviour in torsional buckling. 5. Design and prepare detail structural drawings for execution citing relevant IS codes.
13	SECP03	Core Lab III Model Testing Lab	2020	<ol style="list-style-type: none"> 1. Plan the test set-up for model testing 2. Understand the behavior of structural components.
14	SECP04	Core Lab IV Numerical Analysis Lab	2020	<ol style="list-style-type: none"> 1 Find Roots of non-linear equations by Bisection method and Newton's method. 2 Do curve fitting by least square approximations by using matlab 3 Solve the system of Linear Equations using Gauss - Elimination/ Gauss - Seidal Iteration/ Gauss - Jordan Method 4 To Integrate Numerically Using Trapezoidal and Simpson's Rules 5 To Find Numerical Solution of Ordinary Differential Equations by Euler's Method, Runge- Kutta Method
15	SEPE51	Design of Pre-stressed Concrete Structures	2020	<ol style="list-style-type: none"> 1. Find out losses in the pre-stressed concrete. Understand the basic aspects of pre-stressed concrete fundamentals, including pre and post-tensioning processes.

				<ul style="list-style-type: none"> 2. Analyse pre-stressed concrete deck slab and beam/girders. 3. Design pre-stressed concrete deck slab and beam/girders. 4. Design of end blocks for pre-stressed members.
16	SEOE12	Industrial Safety	2020	<ul style="list-style-type: none"> 1. To list out important legislations related to health, Safety and Environment. 2. To list out requirements mentioned in factories act for the prevention of accidents. 3. To understand the health and welfare provisions given in factories act.

Civil Engineering M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	GTPC01	Advanced Soil Mechanics	2020	<ul style="list-style-type: none"> 1. The students obtain the complete knowledge on Strength and Compressibility of soil mass of soil mass. 2. To learn importance of stress paths on strength Characteristics. 3. The students are able to develop mathematical models for solving different problems in soil mechanics using critical state frame work.
2	GTPC02	Advanced Foundation Engineering	2020	<ul style="list-style-type: none"> 1. The students will be able to analyse and proportion shallow foundation. 2. To learn load transfer mechanisms and proportioning of deep foundations. 3. To comprehend design aspects of foundations in

				<p>problematic soils</p> <p>4. The students will be able to assess the type of foundations to be recommended for construction design of coffer dams.</p>
3	GTPE11	Soil Structure Interaction	2020	<p>1. The student is exposed to soil foundation interaction behavior</p> <p>2. The student learns analysis of structures using soils modeling soil as elastic half space and discretizes springs.</p> <p>3. The student will be able to analyse settlements and load distributions in piles and pile groups subjected to vertical and lateral loads.</p>
4	GTPE12	Ground Improvement Techniques	2020	<p>1. Assess the site or ground conditions and judge for adopting ground improvement techniques for a particular structure and site conditions.</p> <p>2. Select suitable compaction techniques or stabilization methods for improving engineering properties of soils in shallow layers.</p> <p>3. To modify ground conditions by freezing and thermal methods.</p> <p>4. Select suitable reinforced earth methods for stabilizing soils in retaining walls and slopes.</p>
5	GTPE13	Pavement Analysis and Design	2020	<p>1. Assess the factors affecting the performance of pavements.</p> <p>2. Identifying failure criteria and design flexible and rigid pavements.</p> <p>3. Compare and select suitable pavement design approaches, overlays, and design aspects.</p>

6	GTPE22	Environmental Geotechnology	2020	<ol style="list-style-type: none"> 1. Students can understand Soil-environment interaction, Soil mineralogy and 2. Mechanisms of soil-water interaction 3. Students can learn ground water flow and predict contaminant transport phenomenon. 4. Can apply remediation techniques for contaminated site.
7	GTPE23	Critical State Soil Mechanics	2020	<ol style="list-style-type: none"> 1. Acquire fundamentals concept of Stresses and Strains and their states in soils. 2. Comprehend the critical state line and the Roscoe surface. 3. Gain knowledge on Cam-Clay model for analyzing the the plastic behaviour of soils before failure. 4. Familiarize with the Development of constitutive laws for geotechnical materials including linear or nonlinear elastic (hyperbolic), linear elastic perfectly plastic, and nonlinear elastic-plastic models based on the Critical State Soil Mechanics theory.
8	GTCP01	Geotechnical Engineering Lab - 1	2020	<ol style="list-style-type: none"> 1. Determine all Index Properties for Cohesive and Cohesionless Soils 2. Determine Density Index for Cohesionless Soils. 3. Determine Compaction Characteristics for Cohesive Soils 4. Determine Permeability Characteristics for Cohesive and Cohesionless Soils.
9	GTCP02	Geotechnical Engineering Lab - 2	2020	<ol style="list-style-type: none"> 1. Determine Unconfined Compressive Stress for Cohesive Soils.

				<ol style="list-style-type: none"> 2. Determine shear parameter for Cohesionless Soils. 3. Determine Swelling Characteristics by different methods.
10	PGPC41	Research Methodology and IPR	2020	<ol style="list-style-type: none"> 1. Understand research problem formulation. 2. Analyze research related information 3. Follow research ethics 4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5. Understanding that when IPR would take such important place in growth of individuals & Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
11	GTPC03	Dynamics of soils and foundations	2020	<ol style="list-style-type: none"> 1. Students understands theory of vibration and resonance phenomenon, dynamic amplification 2. Students understand propagation of body waves and surface waves through soil. 3. Student exposed to different methods for estimation of dynamic soil properties required for design purpose.

				<p>4. Students apply theory of vibrations to design machine foundation based on dynamic soil properties and bearing capacity.</p> <p>5. Students can predict dynamic bearing capacity and methods of vibration isolation.</p>
12	GTPC04	Subsurface investigations and instrumentation	2020	<p>1. Students can plan subsurface investigation based on the requirement of civil engineering project and site condition. Can finalize depth and number of boreholes</p> <p>2. Students can execute different subsurface exploration tests, collect Disturbed / undisturbed samples for laboratory tests and can suggest design parameters.</p> <p>3. Student exposed to different methods for estimation of soil properties required for design purpose.</p> <p>4. Students can develop instrumentation scheme for monitoring of critical sites</p>
13	GTPE31	Offshore Geotechnical Engineering / Marine Geotechniques	2020	<p>1. Physical and Engineering properties of marine soils and problems specific to marine soil deposits.</p> <p>2. Behavior of sands and clays under cyclic loading</p> <p>3. Site investigation in marine environment including Geophysical methods.</p> <p>4. Assess the factors governing the choice of the most suitable type of foundation for a given marine Structure.</p> <p>5. Select the type of foundation for a given marine Structure.</p>

14	GTPE32	Computational Geomechanics	2020	<ol style="list-style-type: none"> 1. Solution of linear equations 2. Finite difference form of ordinary and partial differential equations 3. Difference between correlation and regression analysis. 4. Apply finite difference technique to solve complex consolidation and seepage problems in Geotechnical Engineering.
15	GTPE33	3. Engineering rock mechanics	2020	<ol style="list-style-type: none"> 1. Assess the Physical and Mechanical properties of rocks. 2. Adopt direct & indirect methods of rock exploration. 3. Conduct different laboratory tests on rocks and analyse the results for rock properties 4. Stress Strain behavior under Compressive, tension and Shear 5. Strength criteria functions applied to Rocks.
16	GTPE41	Earth Retaining Structures	2020	<ol style="list-style-type: none"> 1. Develop an understanding of the fundamental concepts that governs the behaviour of Earth and Earth Retaining Structures. 2. Analyze and Design Retaining Walls, 3. Analyze and Design Braced Cuts, 4. Analyze and Design Shafts, Tunnels and Underground Conduits.
17	GTPE42	Design of underground excavations	2020	<ol style="list-style-type: none"> 1. Students can plan exploration for various underground projects. 2. Students can understand the use of elastic and plastic analysis in the design of underground support system. 3. Students can classify rock masses and select suitable

				<p>method for advising tunnels.</p> <p>4. Design of various tunnel support system.</p> <p>5. Students will have idea about the field tests generally conducted during and after construction of under structures.</p>
18	GTPE43	Physical and Constitutive Modelling in Geomechanics	2020	<p>1. Stress strain models of elasticity of isotropic and anisotropic models.</p> <p>2. Students can understand theory of plasticity and various yield criteria and flow rule.</p> <p>3. Students can apply critical state concept to consolidation and triaxial soil behavior.</p> <p>4. Students can understand the application aspects of elastic plastic models.</p>
19	GTCP03	Sub soil exploration	2020	<p>1. Evaluate vertical and lateral extent of exploration; identify, select, and plan different stages of subsurface exploration for various civil engineering projects.</p> <p>2. Discriminate, Classify and analyses different techniques of exploration to be adopted in rocks and soils.</p> <p>3. Discriminate different types of soil samples, samplers and judge the appropriateness of a sample or sampler for practical cases accounting for the safety and economy.</p> <p>4. Evaluate different in-situ methods of tests to determine engineering properties of soils and locate Ground water table required for safe and economic design of foundations.</p> <p>5. Methods of planning, executing, implementing,</p>

				interpreting, and reporting subsoil investigations based on geophysical methods.
20	GTCP04	Numerical Analysis Lab	2020	<ol style="list-style-type: none"> 1. Develop and Analysis of laboratory tests results using Spread sheets 2. Develop and analysis of Spread sheets for stress distribution for different loading conditions. 3. Determine Bearing Capacity of given soil sample. 4. Able to determine settlements
21	GTPE51	Stability analysis of slopes	2020	<ol style="list-style-type: none"> 1. Identifying types and causes of slope failures. 2. Student will be able to check the stability of earthen dams 3. The safety measures to be undertaken to prevent the instability of slopes, earthen dams and embankments. 4. Understand maintenance and monitoring of slopes.
22	GTPE52	Foundations on weak rocks	2020	<ol style="list-style-type: none"> 1. Understand Rock mass classification and its Engineering properties. 2. Determine engineering properties of in-situ rocks and modes of failure associated. 3. Assess allowable Bearing pressure. 4. Design different types of foundations planned over rock mass.
23	GTPE53	Geotechnical earthquake engineering	2020	<ol style="list-style-type: none"> 1. Students will know the causes and quantification of earthquake. 2. Student will be exposed to the effect of earthquake and ground motion. 3. Student will be able to understand Ground response analysis and Liquefaction effects.

				<p>4. Student will be able to understand the seismic design of foundation</p>
24	GTOE11	Business Analytics	2020	<p>1. Students will demonstrate knowledge of data analytics.</p> <p>2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.</p> <p>3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.</p> <p>4. Students will demonstrate the ability to translate data into clear, actionable insights.</p>
25	GTOE12	Industrial Safety	2020	<p>1. Students will demonstrate knowledge of data analytics.</p> <p>2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.</p> <p>3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.</p> <p>4. Students will demonstrate the ability to translate data into clear, actionable insights.</p>
26	GTOE13	Operations Research	2020	<p>1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis</p> <p>4. Student should able to model the real world problem</p>

				and simulate it.
27	GTOE14	Cost Management of Engineering Projects	2020	<ol style="list-style-type: none"> 1. Students should able to apply the dynamic programming to solve problems of discrete and Continuous variables. 2. Students should able to apply the concept of non-linear programming 3. Students should able to carry out sensitivity analysis 4. Student should able to model the real world problem and simulate it.
28	GTOE15	Composite Materials	2020	<ol style="list-style-type: none"> 1. Students should able to apply the dynamic programming to solve problems of discrete and Continuous variables. 2. Students should able to apply the concept of non-linear programming 3. Students should able to carry out sensitivity analysis <p>Student should able to model the real world problem and simulate it</p>
29	GTOE16	Energy Generation from Waste	2020	<ol style="list-style-type: none"> 1. Students should able to apply the dynamic programming to solve problems of discrete and Continuous variables. 2. Students should able to apply the concept of non-linear programming 3. Students should able to carry out sensitivity analysis <p>Student should able to model the real world problem and simulate it.</p>

Computer Science & Engineering B.Tech

S.No.	Course	Title of the Course	Years of	Course Outcomes
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	Code		Introduction	
1	MA301C	Mathematics III	2020	<p>Understand the analyticity of complex functions and conformal mappings.</p> <p>Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.</p> <p>Describe basic properties of complex integration and having the ability to compute such integrals.</p> <p>Describe conformal mappings between various plane regions.</p>
2	CS302C	Database Management Systems	2020	<ul style="list-style-type: none"> □ Use relational algebra and relational calculus, to express database queries. □ Use SQL to interact with database management systems. □ Design appropriate database tables, using functional dependencies and normal forms. □ Implement a disk-oriented database storage manager with heap table and indexes. □ Understand, compare, and implement the major concurrency control algorithms. □ Implement database recovery algorithms and verify their correctness. □ Identify trade-offs among database systems techniques and contrast distributed/parallel alternatives for both on-line transaction processing and on-line analytical workloads.
3	CS303C	Discrete	2020	<ul style="list-style-type: none"> □ Verify the correctness of an argument using propositional and predicate logic

		Mathematical Structures		<ul style="list-style-type: none"> ▫ Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction. ▫ Solve problems involving recurrence relations and generating functions. ▫ Construct and analyze graph models for problems in different areas. ▫ Design and develop real time application using graph theory
4	CS304C	Basic Electrical Engineering	2020	<ul style="list-style-type: none"> ▫ understand and analyze basic electric and magnetic circuits. ▫ study the working principles of electrical machines and power converters. ▫ introduce the components of low-voltage electrical installations.
5	CS309S	Skill Oriented Course - Basic Python Programming	2020	<ul style="list-style-type: none"> ▫ understand the structure, syntax, and semantics of the Python language. ▫ interpret the concepts of Object-Oriented Programming as used in Python. ▫ demonstrate proficiency in handling Strings and File Systems. ▫ implement desktop/Web-based applications using the Python programming language.
6	PA310A	Audit Course - Constitution of India	2020	<ul style="list-style-type: none"> ▫ the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. ▫ the intellectual origins of the framework of argument that informed the conceptualization of social reforms

				<p>leading to revolution in India.</p> <ul style="list-style-type: none"> ▣ the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. ▣ the passage of the Hindu Code Bill of 1956.
7	CS401C	Digital Electronics and Logic Design	2020	<ul style="list-style-type: none"> ▣ Design and analyze combinational logic circuits ▣ Design and analyze synchronous sequential logic circuits ▣ Design and implement complicated digital systems using Verilog ▣ Design a VLSI circuit for an application
8	CS402C	Simulation and Modeling	2020	<ul style="list-style-type: none"> ▣ describe the components of continuous and discrete systems and simulate the same. ▣ model any system from different fields. ▣ discuss the simulation methods and select the suitable technique on the problems. ▣ implement the model on the computer and from the results, check for the validity of the model and correctness of the assumptions present in the model. ▣ understand the limitations of their model and nuances in computer modeling of systems
9	HS403C	Managerial Economics and Accountancy	2020	<ul style="list-style-type: none"> ▣ Understand Macro Economic environment of the business and its impact on enterprise. ▣ Identify various cost elements of the product

				<p>and its effect on decision making.</p> <ul style="list-style-type: none"> □ Understand the concepts of financial management and smart investment. □ Prepare the Accounting records and interpret the data for Managerial Decisions
10	CS405C	Computer Organization	2020	<ul style="list-style-type: none"> □ Identify the basic structure and functional units of a digital computer. □ Analyze the effect of addressing modes on the execution time of a program. □ Design processing unit using the concepts of hardwired control or microprogrammed control. □ Select appropriate interfacing standards for I/O devices. □ Identify the roles of various functional units of a computer in instruction execution. □ Understand memory hierarchy and its impact on computer cost/performance. □ Understand the advantage of instruction level parallelism and pipelining for high performance processor design
11	CS406C	Design and Analysis of Algorithms	2020	<ul style="list-style-type: none"> □ Develop systematically an algorithm for solving a problem □ Analyze the time and space complexity of the given algorithm □ Identify algorithm design methodology to solve problems. □ Distinguish between P and NP classes of problems
12	CS409S	Skill Oriented Course - Basic Web	2020	<ul style="list-style-type: none"> □ describe and explain the relationship among HTML, XHTML, CSS, JavaScript, XML

		Designing		<p>and other web technologies.</p> <ul style="list-style-type: none"> □ create and publish advanced web pages with the help of HTML frames, scripting languages, and CSS. □ design forms for thick clients using JavaScript with interactive responsiveness and validations. □ design, host and publish websites in various domains
13	CSHN01	Distributed Databases	2020	<ul style="list-style-type: none"> □ Design and implement distributed databases. □ Handle query processing in a distributed database system. □ Comprehend transaction management and analyze various approaches to concurrency control in distributed databases. □ Design and implement various algorithms and techniques for deadlock and recovery in distributed databases
14	CSMN01	Data Structures	2020	<ul style="list-style-type: none"> □ Choose appropriate data structure for the specified problem definition. □ Implement linear and non-linear data structures viz. stacks, queues, linked list, trees, graphs. □ Apply the concept of trees and graph data structures for the real world problems. □ Comprehend the implementation of sorting and searching algorithms

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA301B	MATHEMATICS –III	2020	<ol style="list-style-type: none"> 1. Acquire the knowledge of functions of complex variables. 2. understand power series and expansion of analytic function. 3. understand Laurent Series, poles, singular points, Residue theorem and its applications. 4. analyze the solutions of partial differential equations. 5. discuss the boundary value problems, one dimensional wave equation, heat equation and Laplace Equation.
2	EE302C	ELECTRO MAGNETIC FIELDS	2020	<ol style="list-style-type: none"> 1. get acquainted with different coordinate systems and their transformation. 2. learn different concepts in Electrostatic fields. 3. learn different concepts in magnetic fields 4. get acquainted with time varying electric and magnetic fields.
3	EE303C	NETWORK ANALYSIS	2020	<ol style="list-style-type: none"> 1. Apply Network theorems for the analysis of electrical circuits. 2. Analyze the time domain behavior of electrical circuits under transient conditions. 3. Evaluate the network functions and two-port network parameters. 4. Synthesize the one port networks using

				Foster and Cauer methods.
4	EE304C	D.C. MACHINES AND TRANSFORMERS	2020	<ol style="list-style-type: none"> 1. Understand the concepts of energy conversion principles, constructional details and principle of operation of DC machines and Transformers. 2. Analyze the performance of the DC Machines under various operating conditions using their various characteristics and testing methods. 3. Analyze the parallel operation of DC machines and transformers and select appropriate machine as per applications. 4. Evaluate the performance of Transformers using phasor diagrams, connections, testing methods and equivalent circuits.
5	EE305C	ANALOG ELECTRONICS	2020	<ol style="list-style-type: none"> 1. understand the characteristics of various components. 2. Understand the biasing techniques 3. Design and analyze various rectifiers, small signal amplifier circuits. 4. Design sinusoidal and non-sinusoidal oscillators. 5. Understand the functioning of OP-AMP and design OP-AMP based circuits.
6	EE306L	ELECTRICAL CIRCUITS AND NETWORKS LAB	2020	<ol style="list-style-type: none"> 1. Verify Network theorems for the analysis of electrical circuits. 2. Analyze the time domain behavior of electrical circuits under transient conditions.

				<p>3. Draw the locus diagrams and analyse the resonance conditions.</p> <p>4. Evaluate the two-port network parameters.</p>
7	EE307L	D.C. MACHINES AND TRANSFORMERS LAB	2020	<p>1. Test the performance of any DC machines and single-phase transformers, by conducting suitable experiments and report the results.</p> <p>2. Analyze the various speed control methods of DC motors and characteristics of DC machines.</p> <p>3. Understand the significance of different connections of three-phase transformers.</p>
8	EE309S	COMPUTER SKILLS	2020	<p>1. Identify basic terms, concepts, and functions of computer system components.</p> <p>2. Select and use the appropriate software application to complete a particular task such as a word Processing skill to create, save, modify business documents.</p> <p>3. Identify basic concepts and procedures for creating, viewing, and managing files, and folders for different operating systems.</p> <p>4. Identify basic concepts of organization and procedures for creating, and viewing will software presentation such as PowerPoint.</p>
9	MC310A	CONSTITUTION	2020	<p>1. Understand the premises informing the twin</p>

		OF INDIA		<p>themes of liberty and freedom from a civil rights perspective.</p> <p>2. address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.</p> <p>3. address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.</p>
10	EE401C	POWER SYSTEMS-I	2020	<p>1. Understand the power system structure and principles of energy generation from conventional and renewable energy sources</p> <p>2. Analyze the economic aspects of power generation.</p> <p>3. Acquire the knowledge on parameter calculations and mechanical design in transmission lines.</p>
11	EE402C	INDUCTION MOTORS AND SYNCHRONOUS MACHINES	2020	<p>1. Understand the constructional details and principle of operation of Induction and Synchronous Machines.</p> <p>2. Understand parallel operation, speed control and starting of AC machines.</p> <p>3. Analyze the performance of the Induction and Synchronous Machines using the phasor diagrams, equivalent circuits and by testing.</p>

				4. Select appropriate AC machine for any application and appraise its significance
12	EO403C	MANAGERIAL ECONOMICS AND ACCOUNTANCY	2020	<ol style="list-style-type: none"> 1. Understand Macro Economic environment of the business and its impact on enterprise. 2. Identify various cost elements of the product and its effect on decision making. 3. Understand the concepts of financial management and smart investment. 4. Prepare the Accounting records and interpret the data for Managerial Decisions.
13	EE404C	DIGITAL ELECTRONICS	2020	<ol style="list-style-type: none"> 1. Understand working of logic families and logic gates. 2. Design and implement Combinational and Sequential logic circuits. 3. Understand the process of Analog to Digital conversion and Digital to Analog conversion. 4. Be able to use PLDs to implement the given logical problem.
14	EE405C	SIGNALS AND SYSTEMS	2020	<ol style="list-style-type: none"> 1. Differentiate between various types of signals and understand the implication of operations of signals 2. Understand and classify systems based on the impulse response behaviour of both continuous-time and discrete-time systems 3. Perform domain transformation from time to frequency and understand the

				<p>energy distribution as a function of frequency</p> <p>4. Usefulness of convolution for analysing the LTI systems and understand the concepts of power spectral density through correlation.</p> <p>5. Solve differential and difference equations with initial conditions using Laplace and Z- transforms.</p>
15	EE406L	INDUCTION MOTORS AND SYNCHRONOUS MACHINES LAB	2020	<p>1. Test the performance of induction motors and synchronous machines by conducting suitable experiments and report the results.</p> <p>2. Analyze the speed control methods of three-phase induction motors by conducting suitable experiments.</p> <p>3. Understand the parallel operation and estimate the regulation of alternators.</p>
16	EE407L	ANALOG AND DIGITAL ELECTRONICS LAB	2020	<p>1. Plot the characteristics of Electronic Devices to understand the behavior</p> <p>2. Design, construct and test amplifier circuits and interpret results</p> <p>3. Design and analyze combinational logic circuits</p> <p>4. Design and analyze flip flops and Sequential logic circuits</p>
17	EE409S	PYTHON PROGRAMMING	2020	<p>1. Implement python programming constructs to build small to large applications.</p> <p>2. Implement the problems in terms of real-world objects.</p>

				<p>3. Evaluate and handle the errors during runtime involved in a program.</p> <p>4. Extract and import packages for developing different solutions for real time problems</p>
18	EEHN01	ELECTRICAL MACHINE DESIGN	2020	<p>1. Understand the construction and performance characteristics of electrical machines.</p> <p>2. Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machines</p> <p>3. Understand the principles of electrical machine design and carry out a basic design of an ac machine.</p> <p>4. Use software tools to do design calculations.</p>
19	EEMN01	ELECTRICAL CIRCUITS AND NETWORKS	2020	<p>1. Understand and apply the basic circuit concepts to analyse D.C and A.C. Circuits.</p> <p>2. Apply Network theorems for the analysis of electrical circuits.</p> <p>3. Understand the resonance circuit concept.</p> <p>4. Evaluate the two-port network parameters.</p>
20	EEMN02	ELECTRICAL MACHINES	2020	<p>1. Understand the concepts of energy conversion principles, constructional details and principle of operation of DC and AC machines.</p> <p>2. Analyze the performance of the DC and AC Machines under various operating conditions using their various characteristics and testing methods.</p> <p>3. Understand parallel operation, speed control</p>

				and starting of DC and AC machines. 4. Select appropriate machine for any application and appraise its significance.
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Electrical & Electronics Engineering M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	PSPC 01	POWER SYSTEM ANALYSIS	2020	<ol style="list-style-type: none"> 1. Find the bus admittance and bus impedance matrices of the given power system network 2. Calculate fault currents in each phase 3. Calculate voltage phasors at all buses for the given data using various methods of load flow 4. Rank various contingencies according to their severity 5. Estimate closeness to voltage collapse and calculate PV curves using continuation power flow
2	PSPC 02	ELECTRIC POWER DISTRIBUTION SYSTEM	2020	<ol style="list-style-type: none"> 1. Knowledge of power distribution system 2. Study of Distribution automation and its application in practice

				3. To learn SCADA system
3	PSPE 11	RENEWABLE ENERGY SOURCES	2020	<ol style="list-style-type: none"> 1. Gain knowledge on renewable sources like solar, biomass, wind energies 2. Realize solar energy applications using photo voltaic cells 3. Analyze biogas performance and testing and Hybrid Energy Systems
4	PSPE 12	SMART GRIDS	2020	<ol style="list-style-type: none"> 1. Appreciate the difference between smart grid & conventional grid 2. Apply smart metering concepts to industrial and commercial installations 3. Formulate solutions in the areas of smart substations, distributed generation and wide area measurements 4. Come up with smart grid solutions using modern communication technologies
5	PSPE 13	HIGH POWER CONVERTERS	2020	<ol style="list-style-type: none"> 1. Learn the characteristics of GTOs, IGBTs and use them in practical systems 2. Knowledge of working of multi-level VSIs, DC-DC switched mode converters, cyclo-converters and PWM techniques and the ability to use them properly 3. Acquire knowledge of power conditioners and their applications 4. Ability to design power circuit and protection circuit of PSDs and converters

6	PSPE 14	WIND AND SOLAR SYSTEMS	2020	<ol style="list-style-type: none"> 1. Appreciate the importance of energy growth of the power generation from the renewable energy sources and participate in solving these problems 2. Demonstrate the knowledge of the physics of wind power and solar power generation and all associated issues so as to solve practical problems 3. Identify, formulate and solve the problems of energy crises using wind and solar energy
7	PSPE 15	ENERGY AUDITING AND MANAGEMENT	2020	<ol style="list-style-type: none"> 1. Acquire the background required for engineers to meet the role of energy managers and to acquire the skills and techniques required to implement energy management 2. Identify and quantify the energy intensive business activities in an organization 3. Able to perform Basic Energy Audit in an Organization
8	PSPE 21	POWER SYSTEM DYNAMICS-I	2020	<ol style="list-style-type: none"> 1. Understand the modeling of synchronous machine in details 2. Carry out simulation studies of power system dynamics using MATLAB-SIMULINK, MI POWER 3. Carry out stability analysis with and without power system stabilizer (PSS)
9	PSPE 22	MATHEMATICAL METHODS FOR POWER	2020	<ol style="list-style-type: none"> 1. Knowledge about vector spaces, linear transformation, Eigen values and eigenvectors of

		ENGINEERING		<p>linear operators</p> <p>2. To learn about linear programming problems and understanding the simplex method for solving linear programming problems in various fields of science and technology</p> <p>3. Acquire knowledge about nonlinear programming and various techniques used for solving constrained and unconstrained nonlinear programming problems</p> <p>4. Understanding the concept of random variables, functions of random variable and their probability distribution</p> <p>5. Understand stochastic processes and their classification</p>
10	PSPE 23	PULSE WIDTH MODULATION FOR PE CONVERTERS	2020	<p>1. Learn different types of PWM schemes and their applications</p> <p>2. Asses the THD for different types of PWM schemes</p> <p>3. Choose suitable PWM scheme for different topologies of power electronic circuits</p>
11	PSPE 24	ELECTRIC AND HYBRID VEHICLES	2020	<p>1. Acquire knowledge about fundamental concepts, principles, analysis and design of hybrid and electric vehicles.</p> <p>2. To learn electric drive in vehicles and traction</p>
12	PSPE 25	REACTIVE POWER CONTROL AND MANAGEMENT	2020	<p>1. Understand the significance of reactive power control in power system and principles of various controllers.</p>

				2. To know about the importance of reactive power management and various management techniques employed in power system networks
13	PGPC 01	RESEARCH METHODOLOGY AND IPR	2020	<ol style="list-style-type: none"> 1. Understand research problem formulation. 2. analyze research related information 3. follow research ethics 4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5. Understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. 6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
14	PGPA 11	ENGLISH FOR RESEARCH PAPER WRITING	2020	<ol style="list-style-type: none"> 1. understand how to improve writing skills and level of readability 2. learn about what to write in each section 3. understand the skills needed when writing a Title
15	PGPA 12	DISASTER	2020	

		MANAGEMENT		<ol style="list-style-type: none"> 1. Demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. 2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. 3. Develop the standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in
16	PGPA 13	SANSKRIT FOR TECHNICAL KNOWLEDGE	2020	<ol style="list-style-type: none"> 1. understand basic Sanskrit language 2. understand the Ancient Sanskrit literature about science & technology 3. help to develop logic, being a logical language
17	PGPA 14	VALUE EDUCATION	2020	<ol style="list-style-type: none"> 1. acquire the knowledge of self-development 2. learn the importance of Human values 3. Develop the overall personality
18	PSPC 03	ADVANCED POWER SYSTEM PROTECTION	2020	<ol style="list-style-type: none"> 1. Learn the importance of static Relays 2. Apply appropriate comparator 3. Learn about digital Protection
19	PSPC 04	POWER QUALITY	2020	<ol style="list-style-type: none"> 1. Acquire knowledge about the harmonics,

				<p>harmonic introducing devices and effect of harmonics on system equipment and loads</p> <p>2. To develop analytical modeling skills needed for modeling and analysis of harmonics in networks and components</p> <p>3. To introduce the student to active power factor correction based on static VAR compensators and its control techniques</p> <p>4. To introduce the student to series and shunt active power filtering techniques for harmonics</p>
20	PSPE 31	RESTRUCTURED POWER SYSTEMS	2020	<p>1. Describe various types of regulations in power systems.</p> <p>2. Identify the need of regulation and deregulation.</p> <p>3. Define and describe the Technical and Non-technical issues in Deregulated Power Industry.</p> <p>4. Identify and give examples of existing electricity markets.</p> <p>5. Classify different market mechanisms and summarize the role of various entities in the market.</p>
21	PSPE 32	ADVANCED DIGITAL SIGNAL PROCESSING	2020	<p>1. Knowledge about the time domain and frequency domain representations as well analysis of discrete time signals and systems</p> <p>2. Study the design techniques for IIR and FIR filters and their realization structures.</p> <p>3. Acquire knowledge about the finite word length effects in implementation of digital filters.</p> <p>4. Knowledge about the various linear signal models</p>

				and estimation of power spectrum of stationary random signals 5. Design of optimum FIR and IIR filters
22	PSPE 33	DYNAMICS OF ELECTRICAL MACHINES	2020	<ol style="list-style-type: none"> 1. Formulation of electro-dynamic equations of all electric machines and analyze the performance characteristics 2. Knowledge of transformations for the dynamic analysis of machines 3. Knowledge of determination of stability of the machines under small signal and transient conditions 4. Study about synchronous machine
23	PSPE 34	POWER APPARATUS DESIGN	2020	<ol style="list-style-type: none"> 1. To give a systematic approach for design and analysis of all rotating machines under both transient and steady state conditions with the dimensions and material used 2. Ability to design all types of transformers and special machines
24	PSPE 35	OPERATION & CONTROL OF INTERCONNECTED POWER SYSTEMS	2020	<ol style="list-style-type: none"> 1. Acquire knowledge on unit commitment, load frequency control, optimum operation, scheduling and coordination of hydrothermal plants, economic generation and power and energy interchange. 2. Solve unit commitment, load frequency control, hydrothermal and fuel scheduling and economy interchange problems using various solution methods. 3. Select and apply appropriate methods to operate

				inter connected power systems most economically and at constant frequency by optimum utilization of fuels at different loads.
25	PSPE 41	POWER SYSTEM DYNAMICS-II	2020	<ol style="list-style-type: none"> 1. Gain valuable insights into the phenomena of power system including obscure ones. 2. Understand the power system stability problem. 3. Analyze the stability problems and implement modern control strategies. 4. Simulate small signal and large signal stability problems.
26	PSPE 42	ADVANCED MICRO-CONTROLLER BASED SYSTEMS	2020	<ol style="list-style-type: none"> 1. To learn how to program a processor in assembly language and develop an advanced processor based system 2. To learn configuring and using different peripherals in a digital system 3. To compile and debug a Program 4. To generate an executable file and use it
27	PSPE 43	SCADA SYSTEM AND APPLICATIONS	2020	<ol style="list-style-type: none"> 1. Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications 2. Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system 3. Knowledge about single unified standard architecture IEC 61850 4. To learn about SCADA system components:

				remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server
28	PSPE 44	ARTIFICIAL INTELLIGENCE TECHNIQUES	2020	<ol style="list-style-type: none"> 1. Learn the concepts of biological foundations of artificial neural networks 2. Learn Feedback networks and radial basis function networks and fuzzy logics 3. Identifications of fuzzy and neural network 4. Acquire the knowledge of GA
29	PSPE 45	EMBEDDED SYSTEMS	2020	<ol style="list-style-type: none"> 1. Program embedded system with 8051 as processor. 2. Understand different types of communication through, parallel ports, wireless 3. Understand significance of device drivers and interrupt mechanism 4. Understand features of different types of real time OS.
30	PGPA 21	CONSTITUTION OF INDIA	2020	<ol style="list-style-type: none"> 1. The growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. The intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. The circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through

				adult suffrage in the Indian Constitution. 4. The passage of the Hindu Code Bill of 1956
31	PGPA 22	PEDAGOGY STUDIES	2020	<ol style="list-style-type: none"> 1. The pedagogical practices being used by teachers in formal and informal classrooms in developing countries. 2. the evidence on the effectiveness of these pedagogical practices 3. Learns how teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy
32	PGPA 23	STRESS MANAGEMENT BY YOGA	2020	<ol style="list-style-type: none"> 1. develop healthy mind in a healthy body thus improving social health also 2. improve efficiency
33	PGPA 24	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT	2020	<ol style="list-style-type: none"> 1. develop personality and achieve the highest goal in life 2. lead the nation and mankind to peace and prosperity 3. Help in developing versatile personality.
34	PSPE 51	FACTS AND CUSTOM POWER DEVICES	2020	<ol style="list-style-type: none"> 1. Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation Schemes at Transmission and Distribution level in Power Systems. 2. Learn various Static VAR Compensation Schemes like Thyristor/GTO Controlled Reactive Power Systems, PWM_Inverter based Reactive

				Power Systems and their controls. 3. To develop analytical modeling skills needed for modeling and analysis of such Static VAR Systems.
35	PSPE 52	INDUSTRIAL LOAD MODELING AND CONTROL	2020	<ol style="list-style-type: none"> 1. Knowledge about load control techniques in industries and its application 2. Learn different types of industrial processes and optimize the process using tools like LINDO and LINGO 3. Apply load management to reduce demand of electricity during peak time 4: Apply different energy saving opportunities in industries
36	PSPE 53	POWER SYSTEM TRANSIENTS	2020	<ol style="list-style-type: none"> 1. Knowledge of various transients that could occur in power system and their mathematical formulation 2. Ability to design various protective devices in power system for protecting equipment and personnel 3. Coordinating the insulation of various equipments in power system 4. Modelling the power system for transient analysis
37	PSPE 54	DYNAMICS OF LINEAR SYSTEMS	2020	<ol style="list-style-type: none"> 1. To learn linear system modeling, analysis and design so as to obtain the ability to apply the same to engineering problems in a global perspective 2. Design observers and controllers for linear systems 3. Acquire Knowledge of discrete time linear systems modeling, analysis and design.

				4. Know the stability analysis using Lyapunov methods
38	PSPE 55	MODELING AND ANALYSIS OF HVDC TRANSMISSION SYSTEMS	2020	<ol style="list-style-type: none"> 1. Gain the knowledge on Converter and HVDC system control, Harmonic and Torsional interactions 2. Appreciate different components for the analysis of AC-DC systems and their power flow analysis 3. Be aware of Transient Stability and Dynamic Stability and power modulation of AC-DC systems 4. Simulate HVDC systems and Converters
39	PGOE 11	BUSINESS ANALYTICS	2020	<ol style="list-style-type: none"> 1. The knowledge of data analytics. 2. The ability of think critically in making decisions based on data and deep analytics. 3. The ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. The ability to translate data into clear, actionable insights.
40	PGOE 12	INDUSTRIAL SAFETY	2020	<ol style="list-style-type: none"> 1. Understand the preventive steps for industrial safety 2. Apply the corrosion prevention methods 3. Find the causes and tracking of faults in machine tools and equipment 4. Understand the periodic and preventive maintenance of mechanical and electrical equipment
41	PGOE 13	OPERATIONS RESEARCH	2020	<ol style="list-style-type: none"> 1. Apply the dynamic programming to solve problems of discrete and continuous variables. 2. Apply the concept of non-linear programming 3. Carry out sensitivity analysis

				4. Model the real world problem and simulate it.
42	PGOE 14	COST MANAGEMENT OF ENGINEERING PROJECTS	2020	<ol style="list-style-type: none"> 1. Understand the cost concepts in decision - making 2. Commission, execute and manage Engineering projects 3. Apply the quality management techniques in the execution of projects 4. Apply the quantitative techniques for cost management of projects
43	PGOE 15	COMPOSITE MATERIALS	2020	<ol style="list-style-type: none"> 1. Demonstrate the characteristics of composite materials and composite performance 2. Understand the use of fibres as reinforcement 3. Understand the manufacturing process of metal and polymer matrix composites 4. Demonstrate the failure criteria
44	PGOE 16	ENERGY GENERATION FROM WASTES	2020	<ol style="list-style-type: none"> 1. Demonstrate the energy generation from wastes 2. Understand the biomass pyrolysis and gasification 3. Design, construct and operate biomass combustors 4. Develop bio-energy system.

Electrical & Communication Engineering B.Tech

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MA101	Mathematics–I	2020	<ol style="list-style-type: none"> 1. analyze differential equations and solve them 2. apply differential equations to engineering problems.

				<p>3. Use transformation to convert one type into another type presumably easier to solve.</p> <p>4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients.</p> <p>5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform.</p> <p>6. expand functions as power series using Maclaurin's and Talor's series</p> <p>7. optimize the problems related to OR, Computer science, Probability and Statistics</p> <p>8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions enclosing curve tracing method</p>
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				to find length, area, volume. 9. use multiple integral in evaluating area and volume of any region bounded by the given curves.
2	PY102	ModernPhysics	2020	1. develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses 2. understand the quantum mechanics and ultimately the quantum behavior of charged particles when they are in motion. 3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems 4. apply knowledge of band theory in the area of electronics and understanding the basic electron transportation phenomenon in microdevices. 5. understand the principles in

				<p>electrostatics and electromagnetics and magnetic properties of materials.</p> <p>6. understand size depended properties of nano-dimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices.</p> <p>7. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.</p> <p>8. learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.</p> <p>9. provide multidisciplinary experiences throughout the curriculum.</p> <p>[</p>
3	CS103	Programmingfor ProblemSolving	2020	<p>1. Develop and test programs in C and correct syntax and logical errors.</p>

				<p>2. Implement conditional branching, iteration and recursion.</p> <p>3. Decompose a problem into functions and synthesize a complete program.</p> <p>4. Use arrays, pointers, strings and structures to formulate algorithms and programs</p> <p>5. Use files to perform read and write operations.</p> <p>6. Handle programming assignments based on class, abstraction, encapsulation, overloading and inheritance.</p>
4	EC 104	ElectronicDevices	2020	<p>1. understand the principles of semiconductor physics of the intrinsic, p and n type materials.</p> <p>2. understand the characteristics of the diode and some special function diodes and their application in electronic circuits.</p> <p>3. use mathematics to analyze electronic devices typical of those in switching and rectifier circuits.</p>

				<p>4. understand and utilize the mathematical models of semiconductor junctions and transistors for circuits and systems.</p> <p>5. understand the characteristics of the Transistors and opto-electronic devices and their application in electronic circuits.</p> <p>6. Apply thyristors in power switching and control circuits.</p>
5	ME105	Workshop / Manufacturing Practices	2020	<p>Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.</p>
6	CS106	Programming for Problem Solving Lab	2020	<p>1. Develop the C code for the given algorithm.</p> <p>2. Understand, debug and trace the execution of programs written in C language.</p>
7	CE 107	Environmental Science	2020	<p>1. acquire knowledge in <input type="checkbox"/> <input type="checkbox"/> diverse components of environment and natural resources</p>

				<ul style="list-style-type: none"> □□ ecosystem and biodiversity & its conservation methods □□ population growth and human health □□ green technology <ol style="list-style-type: none"> 2. identify and resolve the issues related to sources of different types of pollutions 3. provide solutions to individuals, industries and government for sustainable development of natural resources 4. apply environmental ethics in protection of diversified ecosystems.
8	MA201	Mathematics–II	2020	<ol style="list-style-type: none"> 1. use ranks of matrices to decide whether the system of linear equations is consistent or not 2. use Cayley-Hamilton theorem to find inverses or powers of matrices. 3. use Eigen values and vectors to reduce Quadratic forms to normal form. 4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools

				<p>such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. use Green's theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. use Stokes' theorem to give a physical interpretation of the curl of a vector field</p> <p>7. use the divergence theorem to give a physical interpretation of the divergence of a vector field</p>
9	CY202	Engineering Chemistry	2020	<p>1. analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.</p> <p>2. rationalize bulk properties and processes using thermodynamic considerations.</p> <p>3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in</p>

				<p>various spectroscopic techniques</p> <p>4. rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.</p> <p>5. list major chemical reactions that are used in the synthesis of molecules.</p>
10	EN 203	English	2020	<p>1. learn the elements of grammar and composition of English Language.</p> <p>2. Learn literary texts such as Short stories and prose passages.</p> <p>3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation.</p> <p>4. develop communication skills by cultivating the habit of reading comprehension passages.</p> <p>5. develop the language skills like listening, speaking, reading and writing.</p> <p>6. Make use of self-instructed</p>

				learner friendly modes of language learning through competence.
11	EN206	English Communication Lab	2020	The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
12	MA301 B	Mathematics– III	2020	At the end of this course students will demonstrate the ability to
13	EC302C	-NetworkTheory	2020	<ol style="list-style-type: none"> 1. Understand basics electrical circuits with nodal and mesh analysis. 2. Appreciate electrical network theorems. 3. Apply Laplace Transform for steady state and transient analysis. 4. Determine different network functions.
14	EC303C	Signals and Systems	2020	<ol style="list-style-type: none"> 1. Differentiate between various types of signals and understand the implication of operations of signals 2. Understand and classify systems based on the impulse response behavior of both

				<p>continuous-time and discrete-time systems</p> <p>3. Perform domain transformation from time to frequency and understand the energy distribution as a function of frequency</p> <p>4. Usefulness of convolution for analyzing the LTI systems and understand the concepts of power spectral density through correlation.</p> <p>5. Solve differential and difference equations with initial conditions using Laplace and Z- transforms</p>
15	EC304C	ElectroMagneticWavesandTransmissionLines	2020	<p>1. Solve electric field intensity and electric flux density in Electrostatic fields.</p> <p>2. Solve magnetic field intensity and magnetic flux density in Magnetostatic fields.</p> <p>3. Analyze Maxwell's equations in static fields, time varying fields, time harmonic fields and study Uniform plane wave characteristics.</p>

				<p>4. Compute reflection coefficient and transmission coefficient of waves at media interface.</p> <p>5. Understand characteristics of high frequency transmission lines and its applications.</p>
16	EC305C	DigitalLogicDesign	2020	<p>1. Design and analyze combinational logic circuits.</p> <p>2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder.</p> <p>3. Design & analyze synchronous sequential logic circuits.</p> <p>4. Use HDL & appropriate EDA tools for digital logic design and simulation.</p>
17	EC306C	AnalogCircuits	2020	<p>1. Design and analyze various amplifier circuits.</p> <p>2. Design sinusoidal oscillators.</p> <p>3. Understand the functioning of OP-AMP and design OP-AMP based circuits.</p>
18	EC309S	EntrepreneurshipandDesignThinking	2020	<p>1. Able to know the concepts related to Entrepreneurship & design thinking.</p>

				<p>2. Explain the fundamentals of Design Thinking and innovation and will equip with design thinking techniques for solving problems in various sectors.</p> <p>3. Analyse to work in a multidisciplinary environment and Evaluate the value of creativity</p> <p>4. Formulate specific problem statements of real time issues</p>
19	MC310 A	ConstitutionofIndia	2020	<p>1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.</p> <p>2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</p> <p>3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the</p>

				<p>proposal of direct elections through adult suffrage in the Indian Constitution.</p> <p>Discuss the passage of the Hindu Code Bill of 1956.</p>
20	EC307L	BasicElectricalEngineeringLaboratory	2020	<p>CO1: Get an exposure to common electrical components and their ratings.</p> <p>CO2: Make electrical connections by wires of appropriate ratings.</p> <p>CO3: Understand the usage of common electrical measuring instruments.</p> <p>CO4: Understand the basic characteristics of transformers and electrical machines</p>
21	EC308L	ElectronicDevicesLaboratory	2020	<p>CO1: Plot the characteristics of electronic devices to understand their behaviour.</p> <p>CO2: Design, construct and test amplifier circuits, Rectifiers, Special devices and interpret the results.</p> <p>CO3: Operate electronic test equipment using hardware/software tools to</p>

				characterize the behaviour of devices and circuits.
22	EC311L	SimulationLaboratory	2020	<p>CO1: Learn how to use the MATLAB software and know syntax of MATLAB programming.</p> <p>CO2: Understand how to simulate different types of signals and system response.</p> <p>CO3: Find the Fourier Transform of a given signal and plot amplitude and phase characteristics.</p> <p>CO4: Analyze the response of different systems when they are excited by different signals and plot power spectral density of signals.</p>
23	EC401C -	LinearControlSystems	2020	<ol style="list-style-type: none"> 1. Identify the various control system components and their representations. 2. Analyze the various time domain parameters. 3. Analysis the various frequency response plots and its system. 4. Apply the concepts of various system stability criterions and design various

				transfer functions of digital control system using state variable models.
24	EC402C -	Probability Theory and Stochastic Processes	2020	<ol style="list-style-type: none"> 1. Understand representation of random signals. 2. Obtain Distribution function, Density functions, and Conditional density functions for different Random variables. 3. Make use of theorems related to random signals. 4. Investigate temporal and spectral characteristics of random processes. 5. Able to Model of different Noise Sources and understand propagation of random signals in LTI systems.
25	HS403C -	Managerial Economics and Accountancy	2020	<ol style="list-style-type: none"> 1. Understand Macro Economic environment of the business and its impact on enterprise. 2. Identify various cost elements of the product and its effect on decision making. 3. Understand the concepts of financial management and smart investment.

				4. Prepare the Accounting records and interpret the data for Managerial Decisions.
26	EC404C -	ICApplications	2020	<ol style="list-style-type: none"> 1. Understand the functioning of OP-AMP and design OP-AMP based circuits. 2. Understand the functioning of voltage regulators and design IC based voltage regulators, 3. Understand the functioning of 555 timer and design 555 timer-based circuits. 4. Understand the functioning of PLL and design PLL based circuits. 5. Design ADC and DAC circuits
27	EC405C -	AnalogCommunications	2020	<p>CO1: Understand the concepts of various Amplitude, Angle and Pulse Modulation schemes. Understand the concepts of information theory with random processes. (L1)</p> <p>CO2: Apply the concepts to solve problems in analog and pulse modulation schemes. (L2)</p> <p>CO3: Analysis of analog</p>

				<p>communication system in the presence of noise. (L3)</p> <p>CO4: Compare and contrast design issues, advantages, disadvantages and limitations of various modulation schemes in analog communication systems. (L4)</p> <p>CO5: Solve basic communication problems & calculate information rate and channel capacity of a discrete communication channel. (L5)</p>
28	EC409S-	PythonProgramming	2020	<ol style="list-style-type: none"> 1. Apply the OOP principles and best practices of python programming. 2. Write clear and effective pythonic code. 3. Create applications using python programming. 4. Implementing databases using SQLite and Access databases using python programming. 5. Understand and feel comfortable in working with web application frameworks. 6. Develop APIs required for the web applications using web

				frameworks like Flask and Fast API.
29	EC406L	-DigitalLogicDesignLaboratory	2020	<ol style="list-style-type: none"> 1. Construct Basic combinational Circuits and Verification of its functionality 2. Construct Sequential Circuits and Verification of its functionality 3. Write structural, behavioral and data flow models for digital circuits 4. Simulate VHDL models of digital circuits
30	EC407L	-AnalogCircuitsLaboratory	2020	<ol style="list-style-type: none"> 1. Know about the usage of equipment/components/software tools used to conduct the experiments in analog circuits. 2. Conduct the experiment based on the knowledge acquired in the theory about various analog circuits using BJT/MOSFETs to find the important parameters of the circuit (viz. Voltage gain, Current gain, bandwidth, input and output impedances etc) experimentally. 3. Analyze the given analog

				<p>circuit to find required important metrics of it theoretically and</p> <p>Compare the experimental results with that of theoretical ones and infer the conclusions.</p> <p>4. Draw the relevant graphs between important metrics of the system from the observed measurements</p>
31	EC408L	-ICApplicationsLaboratory	2020	<ol style="list-style-type: none"> 1. Measure the parameters of IC 741 Op-amp. 2. Design applications of IC 741 Op-amp 3. Realize analog filters using Op-amp. 4. Design multivibrators using 555 IC.

Electrical & Communication Engineering M.Tech Communication System

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CSPC 01	Advanced Digital Signal Processing (Common to Signal Processing SPPC01)	2020	<p>CO1 To understand theory of different filters and algorithms</p> <p>CO2 To understand theory of multirate DSP, solve numerical problems and write</p>

				<p>algorithms</p> <p>CO3 To understand theory of prediction and solution of normal equations</p> <p>CO4 To know applications of DSP at block level</p>
2	CSPC 02	Wireless and Mobile Communication	2020	<p>CO1 Design appropriate mobile communication systems</p> <p>CO2 Apply frequency-reuse concept in mobile communications, and to analyze its effects on interference, system capacity, handoff techniques</p> <p>CO3 Distinguish various multiple-access techniques for mobile communications e.g. FDMA, TDMA, CDMA, and their advantages and disadvantages.</p> <p>CO4 Analyze path loss and interference for wireless telephony and their influences on a mobile-communication system's performance.</p> <p>CO5 Analyze and design CDMA system functioning with knowledge of forward and</p>

				reverse channel details, advantages and disadvantages of using the technology CO6 Understanding upcoming technologies like 3G, 4G etc
3	CSPE 11	DSP Architecture(Common to Signal Processing SPPE11)	2020	CO1 Identify and formalize architectural level characterization of P-DSP hardware CO2 Ability to design, programming (assembly and C), and testing code using Code Composer Studio environment CO3 Deployment of DSP hardware for Control, Audio and Video Signal processing applications CO4 Understanding of major areas and challenges in DSP based embedded systems
4	CSPE 12	Optical Networks	2020	CO1 Contribute in the areas of optical network and WDM network design CO2 Implement simple optical network and understand further technology developments for future enhanced network
5	CSPE	Statistical Information Processing	2020	CO1

	13			<p>Characterize and apply probabilistic techniques in modern decision systems, such as information systems, receivers, filtering and statistical operations</p> <p>CO2 Demonstrate mathematical modelling and problem solving using such models</p> <p>CO3 Comparatively evolve key results developed in this course for applications to signal processing, communications systems.</p> <p>CO4 Develop frameworks based in probabilistic and stochastic themes for modelling and analysis of various systems involving functionalities in decision making, statistical inference, estimation and detection.</p>
6	CSPE 21	Cognitive Radio	2020	<p>CO1 Understand the fundamental concepts of cognitive radio networks.</p> <p>CO2 Develop the cognitive radio, as well as techniques for spectrum holes detection</p>

				<p>that cognitive radio takes advantages in order to exploit it.</p> <p>C03 Understand technologies to allow an efficient use of TVWS for radio communications based on two spectrum sharing business models/policies</p>
7	CSPE 22	Voice and Data Networks (Common to Signal Processing SPPE22)	2020	<p>C01 Protocol, algorithms, trade-offs rationale</p> <p>C02 Routing, transport, DNS resolutions</p> <p>C03 Network extensions and next generation architectures.</p>
8	CSPE 23	Wireless sensor Networks	2020	<p>C01 Design wireless sensor network system for different applications under consideration</p> <p>C02 Understand the hardware details of different types of sensors and select right type of sensor for various applications.</p> <p>C03 Understand radio standards and communication protocols to be used for wireless sensor network based systems and</p>

				<p>application.</p> <p>C04 Use operating systems and programming languages for wireless sensor nodes, performance of wireless sensor networks systems and platforms</p> <p>C05 Handle special issues related to sensors like energy conservation and security challenges</p>
9	CSCP 01	Advanced Digital Signal Processing Lab (Common to Signal Processing SPCP01)	2020	<p>C01 Design different digital filters in software</p> <p>C02 Apply various transforms in time and frequency</p> <p>C03 Perform decimation and interpolation</p>
10	CSCP 02	Wireless and Mobile Communication Lab	2020	<p>C01 Understanding Cellular concepts, GSM and CDMA networks</p> <p>C02 To study GSM handset by experimentation and fault insertion techniques</p> <p>C03 Understating of 3G communication system by means of various AT commands usage in GSM</p> <p>C04</p>

				<p>Understanding CDMA concept using DSSS kit</p> <p>CO5 To learn, understand and develop concepts of Software Radio in real time environment</p>
11	PGMC 01	Research Methodology and IPR	2020	<p>CO1 understand research problem formulation</p> <p>CO2 analyze research related information</p> <p>CO3 follow research ethics</p> <p>CO4 understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity</p> <p>CO5 understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular</p> <p>CO6 understand that IPR protection provides an incentive to inventors for further</p>

				research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits
13	PGPA13	Sanskrit for Technical Knowledge	2020	<ol style="list-style-type: none"> 1. Understanding basic Sanskrit language 2. Ancient Sanskrit literature about science & technology can be understood 3. Being a logical language will help to develop logic in students
14	PGPA14	Value Education	2020	<ol style="list-style-type: none"> 1. Knowledge of self-development 2. Learn the importance of Human values 3. Developing the overall personality
15	CSPC 03	Antennas and Radiating Systems	2020	<p>CO1 Compute the far field distance, radiation pattern and gain of an antenna for given current distribution</p> <p>CO2 Estimate the input impedance, efficiency and ease of match for antennas</p> <p>CO3 Compute the array factor for an array of identical antennas.</p> <p>CO4 Design antennas and antenna arrays for various desired radiation pattern characteristics.</p>
16	CSPC 04	Advanced Communication Networks	2020	CO1 Understand advanced concepts in Communication Networking.

				<p>C02 Design and develop protocols for Communication Networks.</p> <p>C03 Understand the mechanisms in Quality of Service in networking.</p> <p>C04 Optimise the Network Design</p>
17	CSPE 31	Satellite Communication	2020	<p>C01 □□ Visualize the architecture of satellite systems as a means of high speed, high range communication system.</p> <p>C02 □□ State various aspects related to satellite systems such as orbital equations, subsystems in a satellite, link budget, modulation and multiple access schemes.</p> <p>C03 □□ Solve numerical problems related to orbital motion and design of link budget for the given parameters and conditions.</p>
18	CSPE 32	IOT and Applications (Common to Signal Processing SPPE32)	2020	<p>C01 Understand the concept of IOT and M2M</p> <p>C02 Study IOT architecture and applications in various fields</p> <p>C03</p>

				Study the security and privacy issues in IOT.
19	CSPE 33	RF and Microwave Circuit Design	2020	<p>CO1 Understand the behavior of RF passive components and model active components.</p> <p>CO2 Perform transmission line analysis</p> <p>CO3 Demonstrate use of Smith Chart for high frequency circuit design</p> <p>CO4 Justify the choice/selection of components from the design aspects.</p> <p>CO5 Contribute in the areas of RF circuit design.</p>
20	CSPE 41	Markov chain and Queuing System	2020	<p>CO1 <input type="checkbox"/> <input type="checkbox"/> Understand Markov Chains and regenerative processes used in modelling a wide variety of systems and phenomena.</p> <p>CO2 <input type="checkbox"/> <input type="checkbox"/> Model a system as queuing system with some aspect of the queue governed by a random process.</p> <p>CO3 <input type="checkbox"/> <input type="checkbox"/> Understand telecommunication</p>

				<p>systems modelling using Markov chains with</p> <p>special emphasis on developing queuing models.</p>
21	CSPE 42	Pattern recognition and Machine Learning (Common to Signal Processing SPPC03)	2020	<p>CO1 Study the parametric and linear models for classification</p> <p>CO2 Design neural network and SVM for classification</p> <p>CO3 Develop machine independent and unsupervised learning techniques.</p>
22	CSPE 43	Programmable networks- SDN,NFV	2020	<p>CO1 Understand advanced concepts in Programmable Networks.</p> <p>CO2 Understand Software Defined Networking, an emerging Internet architectural framework.</p> <p>CO3 Implement the main concepts, architectures, algorithms, protocols and applications in SDN and NFV.</p>
23	CSCP 03	Antennas and Radiating Systems Lab	2020	<p>CO1 Determine specifications, design, construct and test antenna.</p> <p>CO2 Explore and use tools for designing,</p>

				analyzing and testing antennas. These tools include Antenna design and analysis software, network analyzers, spectrum analyzers, and antenna pattern measurement techniques.
24	CSCP 04	Advanced Communication Networks Lab	2020	<p>CO1 Identify the different types of network devices and their functions within a network.</p> <p>CO2 Understand and build the skills of sub-netting and routing mechanisms.</p> <p>CO3 Understand basic protocols of computer networks, and how they can be used to assist in network design and implementation.</p>
25	PGPA21	Constitution of India	2020	<ol style="list-style-type: none"> 1. the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of

				<p>Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</p> <p>4. the passage of the Hindu Code Bill of 1956.</p>
26	PGPA22	Pedagogy Studies	2020	<p>1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</p> <p>2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</p> <p>3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</p>
27	PGPA23	Stress Management by Yoga	2020	<p>1. Develop healthy mind in a healthy body thus improving social health also</p> <p>2. Improve efficiency</p>
28	PGPA24	Personality Development through Life Enlightenment Skills	2020	<p>1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life</p> <p>2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity</p> <p>3. Study of Neetishatakam will help in developing</p>

				versatile personality of students
29	CSMP 01	Mini Project with seminar	2020	<p>CO1 Understand of contemporary / emerging technology for various processes and systems</p> <p>CO2 Share knowledge effectively in oral and written form and formulate</p>
30	CSPE 51	Remote Sensing (Common to Signal Processing SPPE51)	2020	<p>CO1 Understand basic concepts, principles and applications of remote sensing, particularly the geometric and radiometric principles</p> <p>CO2 Provide examples of applications of principles to a variety of topics in remote sensing, particularly related to data collection, radiation, resolution, and sampling.</p>
31	CSPE 52	High Performance Networks	2020	<p>CO1 Apply knowledge of mathematics, probability, and statistics to model and analyze some networking protocols.</p> <p>CO2 Design, implement, and analyze computer networks.</p> <p>CO3 Identify, formulate, and solve network engineering problems</p>

				<p>C04 Show knowledge of contemporary issues in high performance computer networks. Use techniques, skills, and modern networking tools necessary for engineering practice</p>
32	CSPE 53	MIMO Systems	2020	<p>C01 Understand channel modelling and propagation, MIMO Capacity, space-time coding</p> <p>C02 MIMO receivers, MIMO for multi-carrier systems (e.g. MIMO-OFDM), multi-user communications, multi-user MIMO.</p> <p>C03 Understand cooperative and coordinated multi-cell MIMO, introduction to MIMO in 4G (LTE, LTE-Advanced, WiMAX).</p> <p>C04 Perform Mathematical modelling and analysis of MIMO systems.</p>
33	PGOE 11	Business Analytics	2020	<ol style="list-style-type: none"> 1. knowledge of data analytics. 2. the ability of think critically in making decisions based on data and deep analytics. 3. the ability to use technical skills in predicative and prescriptive

				<p>modeling to support business decision-making.</p> <p>4. the ability to translate data into clear, actionable insights.</p>
34	PGOE 13	Operation Research	2020	<ol style="list-style-type: none"> 1. apply the dynamic programming to solve problems of discrete and continuous variables. 2. apply the concept of non-linear programming 3. carry out sensitivity analysis 4. model the real world problem and simulate it.
35	CSPD 01	Dissertation Phase-I	2020	<p>CO1 Ability to synthesize knowledge and skills previously gained and applied to an indepth study and execution of new technical problem</p> <p>CO2 Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design</p> <p>CO3 Ability to present the findings of their technical solution in a written report</p>

Electrical & Communication Engineering M.Tech Signal Processing

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SPPC 01	Advanced Digital Signal Processing	2020	CO1 To understand theory of different filters and algorithms CO2 To understand theory of multirate DSP, solve numerical problems and write algorithms CO3 To understand theory of prediction and solution of normal equations CO4 To know applications of DSP at block level
2	SPPC 02	Digital Image Video Processing	2021	CO1 Learn different techniques for image enhancement, video and image recovery CO2 Understand techniques for image and video segmentation CO3 Study techniques for image and video compression and objectrecognition
3	SPPE 11	DSP Architecture	2021	CO1 Identify and formalize architectural level characterization of P-DSP hardware CO2 Ability to design, programming (assembly and C), and testing code using Code Composer Studio environment CO3 Deployment of DSP hardware for Control, Audio and Video Signal processing applications CO4 Understanding of major areas and challenges in DSP based embedded system
4	SPPE 12	Computer Vision	2021	CO1 Study the image formation models and feature extraction for computer

				vision CO2 Identify the segmentation and motion detection and estimation techniques CO3 Develop small applications and detect the objects in various applications
5	SPPE 21	Joint time frequency analysis and multiresolution analysis(JTFA and MRA)	2021	<ul style="list-style-type: none"> • Introduction to Transforms in signal processing • To understand Time - Frequency Analysis & Multiresolution • Analysis Study of Wavelets and its Applications
6	SPPE 22	Voice and Data Networks	2021	CO1 Protocol, algorithms, trade-offs rationale CO2 Routing, transport, DNS resolutions CO3 Network extensions and next generation architectures.
7	SPPE 23	Audio Video Coding & Compression	2021	CO1 Familiarity to lossy and lossless compression systems. CO2 Study of Video coding techniques and standards. CO3 Understand audio coding and multimedia synchronization techniques.
8	SPCP 01	Advanced Digital Signal Processing Lab	2021	CO1 Design different digital filters in software CO2 Apply various transforms in time and frequency CO3 Perform decimation and interpolation
9	SPCP 02	Digital Image Video Processing Lab	2021	CO1 Perform image and video enhancement CO2 Perform image and video segmentation CO3 Detect an object in an image/video
10	PGMC 01	Research Methodology and IPR	2021	1. understand research problem formulation. 2. analyze research related

				<p>information</p> <p>3.follow research ethics</p> <p>4.understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</p> <p>5.understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular</p> <p>6.understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.</p>
11	PGPA11	English and Research Paper Writing	2021	<p>1. Understand that how to improve your writing skills and level of readability</p> <p>2. Learn about what to write in each section</p> <p>3. Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission</p>
12	PGPA12	Disaster Management	2021	<p>1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.</p> <p>2. Critically evaluate disaster risk reduction and humanitarian response</p>

				<p>policy and practice from multiple perspectives.</p> <p>3. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in</p>
13	PGPA13	Sanskrit for Technical Knowledge	2021	<p>1. Understanding basic Sanskrit language</p> <p>2. Ancient Sanskrit literature about science & technology can be understood</p> <p>3. Being a logical language will help to develop logic in students</p>
14	PGPA14	Value Education	2021	<p>1. Knowledge of self-development</p> <p>2. Learn the importance of Human values</p> <p>3. Developing the overall personality</p>
15	SPPC 03	Pattern Recognition and Machine Learning	2021	<p>CO1 Study the parametric and linear models for classification CO2 Design neural network and SVM for classification CO3 Develop machine independent and unsupervised learning techniques</p>
16	SPPC 04	Detection and Estimation Theory	2021	<p>CO1 Understand the mathematical background of signal detection and estimation CO2 Use classical and Bayesian approaches to formulate and</p>

				solve problems for signal detection and parameter estimation from noisy signals. CO3 Derive and apply filtering methods for parameter estimation.
17	SPPE 31	Advanced Computer Architecture	2021	CO1 Understand parallelism and pipelining concepts, the design aspects and challenges. CO2 Evaluate the issues in vector and array processors. CO3 Study and analyze the high performance scalable multithreaded and multiprocessor systems.
18	SPPE 32	IOT and Applications	2021	CO1 Understand the concept of IOT and M2M CO2 Study IOT architecture and applications in various fields CO3 Study the security and privacy issues in IOT.
19	SPPE 33	Digital Design and Verification	2021	CO1 Familiarity of Front end design and verification techniques and create reusable test environments. CO2 Verify increasingly complex designs more efficiently and effectively. CO3 Use EDA tools like Cadence, Mentor Graphics.
20	SPPE 41	Multispectral Signal Analysis	2021	CO1 Select appropriate hyper spectral data for a particular application CO2 Understand basic concepts of data acquisition and image processing tasks required for multi and hyper spectral data analysis CO3 Learn techniques for classification and analysis of multi and

				hyper spectral data.
21	SPPE 42	Audio Processing	2021	CO1 Understand different characteristics of Speech. CO2 Identify and analyze different speech analysis system. CO3 Write algorithms for Recognition of speech.
22	SPPE 43	Biomedical Signal Processing	2021	CO1 Understand different types of biomedical signal. CO2 Identify and analyze different biomedical signals CO3 Find applications related to biomedical signal processing
23	SPCP 03	Pattern Recognition and Machine Learning Lab	2021	CO1 Perform image and video enhancement CO2 Perform image and video segmentation CO3 Detect an object in an image/video
24	SPCP 04	Detection and Estimation Theory Lab	2021	CO1 Simulate signals and noise CO2 Detect signals in the presence of noise CO3 Compare various estimation techniques
25	PGPA21	Constitution of India	2021	1. the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of

				Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. the passage of the Hindu Code Bill of 1956.
26	PGPA22	Pedagogy Studies	2021	1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries? 2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners? 3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?
27	PGPA23	Stress Management by Yoga	2021	1. Develop healthy mind in a healthy body thus improving social health also 2. Improve efficiency
28	PGPA24	Personality Development through Life Enlightenment Skills	2021	CO1 Understand of contemporary / emerging technology for various processes and systems CO2 Share knowledge effectively in oral and written form and formulate documents.
29	SPMP 01	Mini Project with seminar	2021	CO1 Understand of contemporary / emerging technology for various processes and systems CO2 Share knowledge effectively in oral and written form and formulate documents.
30	SPPE 51	Remote Sensing	2021	CO1 Understand basic concepts,

				principles and applications of remote sensing, particularly the geometric and radiometric principles CO2 Provide examples of applications of principles to a variety of topics in remote sensing, particularly related to data collection, radiation, resolution, and sampling.
31	SPPE 52	Optimization Techniques	2021	CO1 Understand importance of optimization CO2 Apply basic concepts of mathematics to formulate an optimization problem CO3 Analyze and appreciate variety of performance measures for various optimization problems
32	SPPE 53	Modelling and Simulation Techniques	2021	CO1 Identify and model discrete systems (deterministic and random) CO2 Identify and model discrete signals (deterministic and random) CO3 Understand modelling and simulation techniques to characterize systems/proc
33	PGOE 11	Business Analytics	2021	1. knowledge of data analytics. 2. the ability of think critically in making decisions based on data and deep analytics. 3. the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. the ability to translate data into clear, actionable insights.
34	PGOE	Operation Research	2021	1. apply the dynamic programming to

	13			solve problems of discreet and continuous variables. 2. apply the concept of non-linear programming 3. carry out sensitivity analysis 4. model the real world problem and simulate it.
35	SPPD 01	Dissertation Phase-I	2020	CO1 Ability to synthesize knowledge and skills previously gained and applied to an in- depth study and execution of new technical problem CO2 Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design CO3 Ability to present the findings of their technical solution in a written report.
36	SPPD 02	Dissertation Phase- II	2020	CO1 Ability to synthesize knowledge and skills previously gained and applied to an in- depth study and execution of new technical problem CO2 Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design CO3 Ability to present the findings of their technical solution in a written report.

Mechanical Engineering B.Tech

S.No.	Course	Title of the Course	Years of	Course Outcomes
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	Code		Introduction	
1	MA101	Mathematics – I	2020	<p>1. analyze differential equations and solve them 2. apply differential equations to engineering problems. 3. Use transformation to convert one type into another type presumably easier to solve. 4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients. 5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform. 6. expand functions as power series using Maclaurin's and Talor's series 7. optimize the problems related to OR, Computer science, Probability and Statistics 8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions enclosing curve tracing method to find length, area, volume. 9. use multiple integral in evaluating area and volume of any region bounded by the given curves.</p>
2	CY 101	Engg Chemistry	2020	<p>1. analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. 2. rationalize bulk properties and processes using</p>

				thermodynamic considerations. 3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques 4. rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. 5. list major chemical reactions that are used in the synthesis of molecules.
3	EN103	English	2020	1. learn the elements of grammar and composition of English Language. 2. Learn literary texts such as Short stories and prose passages. 3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation. 4. develop communication skills by cultivating the habit of reading comprehension passages. 5. develop the language skills like listening, speaking, reading and writing. Make use of self-instructed learner friendly modes of language learning through competence
4	EE104	Basic Electrical and Electronics Engineering	2020	1. understand the basic concepts of D.C. single phase and 3- phase supply and circuits and solve basic electrical circuit problems 2. understand the basic

				<p>concepts of transformers and motors used as various industrial drives</p> <p>3. understand the concept of power factor improvement for industrial installations and concepts of most economical power factor</p> <p>4. understand the operation and characteristics of diodes, transistors, integrated circuits and digital circuits.</p>
5	ME105	Engineering Graphics and Design	2020	<p>1. make a distinction between first angle projection and third angle projection of drawing.</p> <p>2 draw hyperbola, parabola, Involutives and Cycloidal curves.</p> <p>3. draw sections of solids including cylinders, cones, prisms and pyramids.</p> <p>4. draw projections of lines, planes, solids and sections of solids. draw orthographic projections of lines, planes, and solids.</p>
6	EN 106	English Communication Lab	2020	<p>The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.</p>
7	MA201	Mathematics – II	2020	<p>1. use ranks of matrices to decide whether the system of linear equations is consistent or not</p> <p>2. use Cayley-Hamilton theorem to find inverses or powers of matrices.</p> <p>3. use Eigen values and vectors to reduce Quadratic forms to normal form.</p> <p>4. to analyze motion problems from real lines to curves and</p>

				<p>surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications. 5. use Green's theorem to evaluate line integrals along simple closed contours on the plane 6. use Stokes' theorem to give a physical interpretation of the curl of a vector field 7. use the divergence theorem to give a physical interpretation of the divergence of a vector field. 8. find the Fourier Series to represent a function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic phenomenon. 9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions. 10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena</p>
8	PY 202	Engineering Physics	2020	<p>1. Develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses 2. understand the quantum mechanics and ultimately the quantum behavior of</p>

				<p>charged particles when they are in motion. 3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems 4. apply the basic principles of Mechanics of rigid body and continuous media and their applications understand the principles in electrostatics and electromagnetics and magnetic properties of materials. 5. understand size depended properties of nano-dimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices. 6. think and participate deeply, creatively, and analytically in emerging areas of engineering technology. 7. Learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis. 8. provide multidisciplinary experiences throughout the curriculum</p>
9	CS 203	Programming for Problem Solving	2020	<p>1. Develop and test programs in C and correct syntax and logical errors. 2. Implement conditional branching, iteration and recursion. 3. Decompose a problem into functions and synthesize a complete program. 4. Use arrays,</p>

				pointers, strings and structures to formulate algorithms and programs 5. Use files to perform read and write operations. 6. Handle programming assignments based on class,abstraction, encapsulation, overloading and inheritance.
10	CE 204	Engineering Mechanics	2020	1. apply the basic knowledge of force system. 2. know the types of supports occur in civil engineering structures 3. know the geometrical properties of different cross sections. 4. understand different types of stresses and strains, elastic constants. 5. understand the behavior of different internal forces under different types of loading
11	ME 205	Workshop / Manufacturing Practices	2020	:Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricatecomponents using different materials
12	CS 206	Programming for Problem Solving Lab	2020	1. Develop the C code for the given algorithm. 2. Understand, debug and trace the execution of programs written in C language
13	CE 207	Environmental Science	2020	1. acquire knowledge in • diverse components of environment and natural resources • ecosystem and biodiversity

				<p>& its conservation methods • population growth and human health • green technology</p> <p>2. identify and resolve the issues related to sources of different types of pollutions</p> <p>3. provide solutions to individuals, industries and government for sustainable development of natural resources</p> <p>4. apply environmental ethics in protection of diversified ecosystems.</p>
14	MA301B	Mathematics – III	2020	<p>1. After the completion of course, students will be able to Understand the analyticity of complex functions and conformal mappings.</p> <p>2. Apply Cauchy’s integral formula and Cauchy’s integral theorem to evaluate improper integrals along contours.</p> <p>3. Describe basic properties of complex integration and having the ability to compute such integrals.</p> <p>4. Describe conformal mappings between various plane regions.</p> <p>5. Apply the concepts of Complex Analysis in many branches of Engineering, including the branches of hydrodynamics, thermodynamics, and particularly quantum mechanics.</p> <p>6. Compute the residue of a function and use the Residue Theory to evaluate a contour integral or an integral over the</p>

				real line. 7. Formulate/solve/classify the solutions of Partial differential equations. 8. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method. 9. Apply Variables separable methods to solve boundary value problems. 10. Find the solution of one dimensional wave equation, heat equation and Laplace equation.
15	ME302C	Strength of Materials	2020	CO1 Analyze the statically determinate and indeterminate problems CO2 Determine the stresses and strains in the members subjected to axial, bending and torsional loads CO3 Evaluate the slope and deflection of beams subjected to loads CO4 Determine the principalstresses and strains in structural members CO5 Determine the torsionalstress of structural beam
16	HS303C	Managerial Economics and Accountancy	2020	CO1 Understand Macro Economic environment of the business and its impact on enterprise. CO2 Identify various cost elements of the product and its effect on decision making. CO3 Understand the concepts of financial management and smart investment. CO4 Prepare the Accounting records and interpret the data for Managerial Decisions.

17	ME304C	Manufacturing Processes	2020	CO 1 Able to understand the basic concepts of manufacturing. CO 2 Able to select suitable manufacturing process to produce products of desired size and shape. CO3 Able to understand the basic manufacturing processes such as foundry and metal forming processes etc. CO4 Ability to distinguish between gas welding and arc welding fabrication processes.
18	ME305C	Basic Thermodynamics	2020	<ul style="list-style-type: none"> ➤ After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions ➤ Students can evaluate changes in thermodynamic properties of substances ➤ The students will be able to evaluate the performance of energy conversion devices ➤ The students will be able to differentiate between high grade and low grade energies. ➤ The students will be able to evaluate the performance of air standard cycles.
19	MC310A	Constitution of India	2020	<ol style="list-style-type: none"> 1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. Discuss the intellectual origins of the framework of argument that informed the

				conceptualization of social reforms leading to revolution in India. 3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. Discuss the passage of the Hindu Code Bill of 1956.
20	ME401C	Fluid Mechanics and Hydraulic Machinery	2020	CO1 Understand and analyze simple flow situations and solve fluid flow problems. CO2 Classify flows and evaluate the flow through pipes and laminar flows. CO3 Apply the knowledge of boundary layer theory and dimensional analysis. CO4 Design and evaluate the performance of centrifugal and reciprocating pumps. CO5 Design and analyze the characteristics of turbines
21	ME402C	Kinematics of Machinery	2020	CO1 Understand the principles of kinematic pairs, chains and their classification, DOF, inversions, equivalent chains and planar mechanisms. CO2 Acquire knowledge and develop straight line motion mechanisms and steering mechanisms. CO3 Able to draw velocity and

				acceleration diagrams for different mechanisms. CO4 Able to design and develop gear and gear train depending on application. CO5 Design cams and followers for specified motion profiles.
22	ME403C	Applied Thermodynamics	2020	CO1 Understand the 1st law analysis of combustion reactions CO2 Understanding of various steam power cycles, boilers and draughts. CO3 Acquire the knowledge about the steam generators and steam properties CO4 Acquire the knowledge on compressible flows of nozzles CO5 Acquire the knowledge on the performance of steam turbines.
23	ME404C	Advanced Engineering Graphics	2020	CO1 Able to draw Projections of solids and Auxiliary projections of solids parallel to one plane perpendicular to both the planes CO2 Able to analyze and draw section of solids inclined to both the planes CO3 Able to develop surfaces of solids which are perpendicular to both the planes CO4 Able to draw interpretation of solids in any angle CO5 Able to draw isometric projections of simple objects
24	ME405C	Machine Tools and Metal Cutting	2020	CO 1 Able to understand the basic concepts of metal cutting and basic machine tools of workshop practice. CO

				2 Able to make a distinction between machine tools employing single point cutting tool and multipoint cutting tool. CO3 Prepared to cut gear teeth on a given job on a milling machine by adopting suitable indexing method. CO4 Ability to understand the basic features of Capstan and Turret lathes and machining by abrasive grains.
25	ME406L	Fluid Mechanics and Hydraulic Machinery Lab	2020	CO1 Able to calibrate the flow measuring devices CO2 Able to calculate loss coefficients for use in the pipe flow analysis. CO3 Able to prepare the characteristic curves for the pumps.
26	ME407L	IC Engines Lab	2020	CO1 Estimate energy distribution by conducting heat balance test on IC engines. CO2 Conduct constant speed and variable speed tests on IC engines and interpret their performance. CO3 Evaluate the performance of air compressor.
27	ME408L	Electronics and Electrical Engineering Lab	2020	CO1 Verify Network Theorem and analysis of Electrical Circuits CO2 Understand the Significance and performance of DC Machines and Single phase Transformers CO3 Design and analyze various Rectifiers & Logic Gates
28	ME409S	MATLAB	2020	CO 1 Able to understand the basic

				<p>features of MATLAB platform CO 2 Able to distinguish between Script file and Function file CO3 Prepared to write simple programmes and to solve systems of linear algebraic equations – that is problem solving techniques. CO4 Ability to make use of the numerical power of MATLAB in practical applications such as linear regression and interpreting and plotting of complex data with ease</p>
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Mechanical Engineering M.Tech (Industrial Engineering)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	IEPC 01	Operations Planning and Control	2020	<ol style="list-style-type: none"> 1. Forecasting principles and techniques for short range and long range planning 2. Production requirements for each product and plan the shop floor activities 3. Work station loading and scheduling of paths to avoid bottle necks for smooth production 4. Solution for product mix decision using OR techniques. 5. Optimal job sequences to achieve the minimum make span with maximum production output
2	IEPC 02	Work System Design	2020	<ol style="list-style-type: none"> 1. Work study principle and design effective work layout for minimal hand

				and body motions. 2. Design process for improvement and design the method study. 3. Estimation of time for each operation through micro motion study so as to eliminate unnecessary movements. 4. Design the ergonomics for effective usage of hand and body motions.
3	IEPE 11	Applied Probability and Statistics	2020	1. Basic concepts of sampling applied in population enumeration. 2. Regression techniques for application and forecast the demand and related variables 3. Testing of hypothesis using statistical distributions. 4. Correlation between the observed values and experimental values for analysis of variance.
4	IEPE 12	Financial Management & Control	2020	1. Clearly understand the cost management discipline and process 2. Recognise potential pitfalls and understand avoidance strategies 3. Use a cost management estimation and control plan 4. Understand the process and importance of Cost Estimation, Cost Budgeting and Cost Control
5	IEPE 13	Human Resource Management	2020	1. Critically evaluate and apply theories and models of HRM that explain the nature and significance of key HRM practices and HRM outcomes as they relate to diverse organisational contexts. 2. Critically analyse and apply the

				<p>emerging strategic role that HRM plays in a changing business environment and workplace to maintain current policies and procedures</p> <p>3. Analyse and align HR systems and processes to leadership strategies and objectives in contemporary organisations to promote best practice in HR performance.</p> <p>4. Identify and evaluate key organisational approaches to improving HR outcomes for both the organisation and its employees</p> <p>5. Critically analyse employee-employer issues using relevant ethical and legal processes and approaches to solve problems.</p>
6	IEPE 21	Design for Manufacturing	2020	<p>1. Design components for machining</p> <p>2. Simulate the casting design and choose the best casting process for a specific product.</p> <p>3. Evaluate the effect of thermal stresses in weld joints</p> <p>4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation mechanisms</p> <p>5. Design plastic components for machining and joining and selecting a proper processes for different joining cases</p>
7	IEPE 22	Marketing Management	2020	<p>1. State the role and functions of marketing within a range of</p>

				<p>organizations. 2. Describe key marketing concepts, theories and techniques for analysing a variety of marketing situations. 3. Use written formats to communicate marketing outcomes. 4. Apply the introduced conceptual frameworks, theory and techniques to various marketing contexts. 5. Synthesise ideas into a marketing plan.</p>
8	IEPE 23	Facilities Planning	2020	<p>1. Able to know the concept of facilities planning that aid in design of Product, Process and schedule design. 2. Able to design Material handling equipment for industrial and non industrial purpose. 3. Able to design handling, receiving and shipping of goods using computer aided layout software. 4. Able to solve Problems of ware house, conveyor and allocation models using quantitative approach. 5. Able to simulate the waiting line models, storage models and conveyor models using simulation software.</p>
9	IECP 01	Industrial Engineering Lab-I	2020	<p>1. To pursue the method adopted in performing the operation. 2. Understanding of reliable and flexible method to accomplish hectic task in minimum possible time. 3. To record the human activities during working</p>

				conditions using scientific methods. 4. To study the performance rating of individual worker and to cost accordingly 5. Development of new techniques to minimize the bottlenecks
10	IECP 02	Simulation Lab - I	2020	1. Able to understand the basic programming knowledge with respect to domain. 2. Able to develop a program to solve N job 2 machine problem using C software, and to develop a program in C to solve inventory price breaks problem 3. Able to solve inventory control problem for Two Phase Method 4. Able to solve queuing theory problems in Big M-Method. 5. Able to solve linear programming and non-linear programming problems using Simplex Method
11	PGMC 01	Research Methodology and IPR	2020	At the end of this course, students will be able to Understand research problem formulation. Analyze research related information Follow research ethics Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to

				emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
12	IEPC 03	Advanced Operation Research	2020	1. Able to solve nonlinear problems using Kuhn Tucker conditions. 2. Able to solve Un-constrained and constrained minimization problems using programming methods. 3. Ability to solve multi objective problems using Goal programming. 4. Able to develop meta heuristic algorithms to solve optimization problems.
13	IEPC 04	Quality Control and Reliability Engineering	2020	1. Able to maintain quality in products using quality circle principles. 2. Able to apply statistical methods to accept the lot of samples. 3. Able to increase the reliability of product through statistical approach. 4. Able to judge whether the lots of samples are to be accept or reject. 5. Learn fundamentals of reliability management and risk assessment
14	IEPE 31	Supply Chain Management	2020	1. Managerial decision plans for effective

				<p>implementation with competitive supplies 2. Demand of the materials and maintain zero inventories with proper supply chain. 3. Manufacturing operations and allocation of resources for optimal production. 4. Proper sales market so as to plan the MRP and lean manufacturing concepts 5. Logistics for purchasing raw materials and maintain continuous chain with suppliers and customers</p>
15	IEPE 32	Project Management	2020	<p>1. Better understanding of the project principles and project life cycle so as to avoid the project delays and the design stage itself to arrive at the Break-even point 2. Better analysis of the project planning, the role and responsibility of the team work in the assignment of jobs 3. Organization structure the responsibilities and role of leaders and team management 4. Process of implementation of performance measurements for better productivity and project process control</p>
16	IEPE 33	Discrete Event System Simulation	2020	<p>1. Classify various simulation models and give practical examples for each category 2. Construct a model for a given set of data and motivate its validity 3. Generate and test random number</p>

				<p>variates and apply them to develop simulation models</p> <p>4. Analyze output data produced by a model and test validity of the model</p> <p>5. Explain parallel and distributed simulation methods</p>
17	IEPE 41	Productivity Engineering & Management	2020	<p>1. Identification and formulation productivity measurement at national level with diversity concepts</p> <p>2. Development of suitable software for productive evaluation based on objective matrix and decision tree</p> <p>3. Identification of long term and short term productive models in industry for improvement of the productivity</p> <p>4. University-industry interaction for entrepreneurship development and technology transfer</p>
18	IEPE 42	Logistics Engineering & Management	2020	<p>1. An ability to apply the knowledge, techniques, skills, and modern tools of the discipline to Engineering Logistics technology;</p> <p>2. An ability to apply knowledge of engineering, management and technology to Engineering Logistics related issues;</p> <p>3. An ability to identify analyse and solve Engineering Logistics related issues;</p> <p>4. An ability to identify, analyse, and solve narrowly defined Engineering Logistics technology problems;</p> <p>43 Page</p> <p>5. An ability to apply written, oral, and graphical</p>

				communications in both technical and non-technical environments and an ability to identify and use appropriate technical and management literature;
19	IEPE 43	Service Engineering & Management	2020	1. Able to acquire knowledge on focusing on customer and service management 2. Able to manage modern control system, BPO and Services marketing 3. Able to maintain good customer relationship, data mining knowledge management 4. Able to apply utility theory, simulation modeling in management science applications.
20	IECP 03	Industrial Engineering Lab-II	2020	1. Understand the forecasting techniques. 2. Understand the control charts for variables and attributes. 3. Understand the development of bills. 4. Understand the processing the charts. 5. Understand the utilization of work sampling.
21	IECP 04	Simulation Lab - II	2020	1. Understand the concept of PERT, Transportation and Queuing models. 2. Understand the solving of sequencing and assignment problem. 3. Understand the Taguchi and response Surface Methodology using DOE. 4. Understand the single & multi response optimization.
22	PGPA 02	Audit Course-II	2020	1. Understanding of key concepts in disaster risk reduction and humanitarian response. 2. Evaluate disaster risk

				reduction and humanitarian response policy and practice from multiple perspectives. 3. Understanding the development of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries.
23	IEPE 51	Design and Analysis of Experiments	2020	1. Formulate objective(s) and identify key factors in designing experiments for a given problem. 2. Develop appropriate experimental design to conduct experiments for a given problem. 3. Analyze experimental data to derive valid conclusions. 4. Optimize process conditions by developing empirical models using experimental data. 5. Design robust products and processes using parameter design approach.
24	IEPE 52	System Dynamics	2020	1. Ability to develop students' skills in analyzing, simulating, and identifying dynamic systems based upon their input-output responses. 2. Develop and analyze a simulation model that provides a useful explanation of a given problematic

				behaviour in a narrowly-defined task 3. Able to compare popular social science modeling paradigms such as research economics and cross impact theory
25	PGOP 13	Operation Research	2020	1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables. 2. Students should able to apply the concept of non-linear programming 3. Students should able to carry out sensitivity analysis 4. Student should able to model the real world problem and simulate it.

Mechanical Engineering M.Tech (Product Engineering)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	PEPC 01	Advanced Manufacturing Processes	2020	1. Students can able to demonstrate different unconventional machining processes 2. Able to test the influence of different process parameters on the performance and their applications 3. Able to select the different types of composites for different applications.
2	PEPC 02	Advanced material technology	2020	1. Students are capable to define the concept of materials i.e., conventional materials with their structure, such as electronic configuration, structure of atom, etc. 2. Students become aware of

				different conventional materials such as metallic and non metallic materials, structures and their applications. 3. Students will be able to demonstrate the need for newer materials by comparing the limitations of conventional materials. 4. They will be able to compare the types of newer materials along with their properties and applications. 5. They will be able to compile about the properties, structure of ceramic materials and their need for newer applications and processing techniques.
3	PEPE 11	Applied Probability and Statistics	2020	the end of the course student will be able to learn the 1. Basic concepts of sampling applied in population enumeration. 2. Regression techniques for application and forecast the demand and related variables 3. Testing of hypothesis using statistical distributions. Correlation between the observed values and experimental values for analysis of variance
4	PEPE 12	Operations Planning and Control	2020	1. Forecasting principles and techniques for short range and long range planning 2. Production requirements for each product and plan the shop floor activities 3. Work station loading and scheduling of paths to avoid bottle necks for smooth production 4. Solution for product mix decision

				using OR techniques. 5. Optimal job sequences to achieve the minimum make span with maximum production output
5	PEPE 13	Advanced Casting Technology	2020	<ol style="list-style-type: none"> 1. Knowing and identification of materials for moulding the additives, coating and the methods of sand controls 2. Identification of different furnaces for metal melting and design the suitable furnace depending materials 3. Understanding of the concepts related to the casting processes and the factor those influence the design process for metals and alloys 4. Knowing the various properties of liquid metals and their compositions and attain the various alloys depending upon the temperature, Iron-carbon diagram 5. Understanding the principles of mechanization of foundries with their layouts and purchase of suitable layout
6	PEPE 21	Robotics	2020	<ol style="list-style-type: none"> 1. Importance of robotics in today and future goods production 2. Robot configuration and subsystems 3. Principles of robot programming and handle with typical robot 4. Working of mobile robots 5. The Student must be able to design automatic manufacturing cells with robotic control using the principle behind robotic drive system,

				end effect ors, sensor, machine vision robot kinematics and programming.
7	PEPE 22	Design for Manufacturing	2020	1. Design components for machining. 2. Simulate the casting design and choose the best casting process for a specific product. 3. Evaluate the effect of thermal stresses in weld joints. 4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation mechanisms. 5. Design plastic components for machining and joining and selecting a proper processes for different joining cases.
8	PEPE 23	Metrology & Computer	2020	1. Metrology, quality control and Inspection so that they can meet the challenges in the industries. 2. Various instruments and measuring systems with the help of laser and other advanced computer integrated systems. 3. Students will be able to measure any type of features, forms with the help of CMM.
9	PECP 01	Production Engineering Lab – I	2020	1. Describe the geometry of single point cutting tool. 2. Apply knowledge of metal cutting to perform various machining operations. 3. Explain the working and use of various components of conventional machine tools. 4. Identify the sequence of operation to process a job

10	PECP 02	CAD Lab	2020	<p>1. Draw complex geometries of machine components in sketcher mode. 2. Create complex engineering assemblies using appropriate assembly constraints. 3. Develop G and M codes for turning and milling components. 4. Generate automated tool paths for a given engineering component. 5. Generate automated tool paths for a given engineering component.</p>
11	PGMC 01	Research Methodology and IPR	2020	<p>1. Understand research problem formulation. 2. Analyze research related information 3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 4. Understanding that when IPR would take such important place in growth of individuals & Nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. 5. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits</p>

12	PEPC 03	Computer Integrated Manufacturing	2020	<p>1. Understand the effect of manufacturing automation strategies and derive production metrics. 2. Analyze automated flow lines and assembly systems, and balance the line. 3. Design automated material handling and storage systems for a typical production system. 4. Design a manufacturing cell and cellular manufacturing system. 5. Develop CAPP systems for rotational and prismatic parts.</p>
13	PEPC 04	Metal Cutting Tool Design	2020	<p>1. Ability to extend, through modeling techniques, the single point, multiple point and abrasive machining processes 2. Estimate the material removal rate and cutting force, in an industrially useful manner, for practical machining processes 3. Prediction of the surface finish in machining processes 4. Understand the practical aspects of tool wear and tool life, and their influence on economics Understand the tool and work piece temperatures and their effect on quality</p>
14	PEPE 31	Automation Manufacturing	2020	<p>1. Solve the line balancing problems in the various flow line systems with and without use buffer storage 2. Understand the different automated material handling, storage and retrieval systems and automated inspection systems. 3. Use</p>

				of Adaptive Control principles and implement the same online inspection and control
15	PEPE 32	Metal Forming Technology	2020	1. Metal forming fundamentals and applications. 2. Metal forming mechanics. 3. Workability of testing techniques. 4. Tribology in metal forming and other phenomena
16	PEPE 33	Additive Manufacturing	2020	1. Identify the need for time compression in product development and manufacturing. 2. Model and fabricate any complex engineering product. 3. Select the rapid manufacturing technology for a given application. 4. Minimize various errors that are occurring during conversion of CAD models. 5. Illustrate the working principles of various rapid manufacturing technologies. 6. Optimize the quality of parts produced by the various rapid manufacturing technologies.
17	PEPE 41	Energy Management	2020	1. Understanding basics of demand side management and mechanisms (technical, legal or financial) that influence energy consumption. 2. Recognizing opportunities for increasing rational use of alternative energies. 3. Learning the basics of energy auditing with application

				on different sectors. 4. Able to take the decisions in budget estimations and evaluate risk analysis
18	PEPE 42	Advanced Welding Processes	2020	1. Weld ability and perform different weld ability testing for different metals. 2. Different dissimilar metal and its cladding. 3. Application of preheat and PWHT of weld joints as per codes and standards used in fabrication industry. 4. Knowledge about different methods for increasing service life of equipment
19	PEPE 43	Oil Hydraulics and Pneumatics	2020	1. Identify and analyze the functional requirements of a power transmission system for a given application. (Application involving fluid power transmission) 2. Design an appropriate hydraulic or pneumatic circuit or combination circuit like electro-hydraulics, electro-pneumatics for a given application. Develop a circuit diagram. 3. Visualize how the hydraulic/pneumatic circuit will work to accomplish the function. 4. Selection and sizing of components of the circuit.
20	PEPE 51	Finite Element Methods	2020	1. Able to design, set up, and conduct engineering experiments and analyze the results. 2. An ability to carry out projects and research in interdisciplinary areas. 3. Graduates will possess managerial and

				<p>leadership skills with professional ethical practices and will understand the proper use of technical papers, copyrights and patents, recent advances in Finite Element Method field. 4. Able to understand the impact of Finite Element Method solutions in a global, economic, environmental, and societal context by participating at national level competitions like technical paper presentation, quiz programs, essay writing competitions, Industrial tours, Alumni association. 5. Recognition of the need for, and an ability to engage in lifelong learning and comprehend the current professional issues.</p>
21	PEPE 52	Expert Systems in Manufacturing	2020	<p>1. Fundamental theories, concepts, and applications of computer science in solving real-time problems. 50 P a g e 2. Able to Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information. 3. Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems. 4. Able to solve the problems in the field of machining, inventory control, process planning with the help of expert systems.</p>

22	PGOP 11	Business Analytics	2020	1. Students will demonstrate knowledge of data analytics. 2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics. 3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. Students will demonstrate the ability to translate data into clear, actionable insights.
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2.6.1: The institution has stated learning outcomes (generic and programme specific)/graduate attributes which are integrated into the assessment process and widely publicized through the website and other documents

2019-2020

SVU COLLEGE OF ARTS

1. Adult & Continuing Education

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	MAAE -1.1	Alternative Learning Systems	2019	<ol style="list-style-type: none"> 1.Remembrance of different forms of learning. 2.Application of different technology support services for effective learning. 3.Organization and administration of nonformal education programmes. 4.Evaluation of nonformal education programmes.
2	MAAE-1.2	Policy Studies In Adult/Continuing Education	2019	<ol style="list-style-type: none"> 1.Identify the socio-political movements during pre-independence period for the promotion of literacy. 2. Analyze the trends of adult education programmes during post-independence period from social education to saakshar Bharat Mission. 3. Describe the National and International organizations efforts for the promotion of literacy at various levels. 4. Explain the State & Central Govt policies on adult education and special reference to literacy, post-literacy and continuing education.
3	MAAE-1.3	Adult Psychology And Learning	2019	<ol style="list-style-type: none"> 1. Acquire knowledge on psychological foundations and its relevance to Adult Education and Learners. 2. Learn classification of motives and motivation techniques to motivate the Adult Learner. 3. Compare the Adult Personality & Child personality based on three Domain principles. 4. Examine the Adult Learning characteristics and theories of learning, eventually he/she will apply all aspects in adult class room activity.

4	MAAE-1.4	Socio-Philosophical Foundatons Of Adult Education	2019	<ol style="list-style-type: none"> 1. Create thinking capacity to survival in the present society with philosophical approach. 2. Know great eminent leaders biography, sacrifices their lives for society. 3. Aware Dalit movement, women movement, co-operative movement in society especially rural areas. 4. Examine the problems of society with reference to bonded labor, child labour, untouchability, transgender and provide awareness on human rights.
5	MAAE-1.5	Communication Methods in Adult Education	2019	<ol style="list-style-type: none"> 1. Remembering the concept and methods of communication and their application to adult Education 2. Identifying different models of communication. 3. Describing the media of communication and their utility in continuing education. 4. Realising the use of different Audio-visual aids in teaching learning process.
6	MAAE-1.6	Human Values And Professional Ethics-I	2019	<ol style="list-style-type: none"> 1. know the importance of professional ethics and to implement the ethical values in various professions. 2. understand about the Good and bad values and to analyze the basic moral concepts. 3. inculcate the students in the aspects of pursharthas . 4. Know different crimes and its impact on personal and social life and theories of punishment
7	MAAE-2.1	Recent Trends In Adult And Continuing Education	2019	<ol style="list-style-type: none"> 1. Identify the variations of literacy growth among States and Nation with reference to gender, rural and urban.

				<p>2. Recognize the functions, activities of JSS and Saakshar Bharat Mission, to promote Life Long learning.</p> <p>3. Understand the five-year plan period programmes in terms of literacy, non-formal and functional literacy.</p> <p>4. Examine the significance of the extension activities as third dimension of literacy programmes at field level.</p>
8	MAAE-2.2	Curriculum And Methods Of Literacy Teaching	2019	<p>1. Remembering the meaning, foundations and theories of curriculum development with reference to adult learners.</p> <p>2. Distinguishing different principles and approaches of curriculum development.</p> <p>3. Interpreting the needs and interests of lifelong learners.</p> <p>4. Executing to evaluate Adult Education programmes</p>
9	MAAE-2.3	Research Methods In Adult Education	2019	<p>1. Understanding the concepts and methods of research.</p> <p>2. Adopting the suitable sampling methods for research studies.</p> <p>3. Developing tools for research studies.</p> <p>4. Ability of research report writing.</p>
10	MAAE-2.4	Field Work & Practical Assignments	2019	<p>1. Application of knowledge and skills in project designing</p> <p>2. Ability to do research work.</p> <p>3. Finding solutions to the problems identified in his research work.</p> <p>4. Preparing the research report.</p>

11	MAAE-2.5	Management Of Adult/Continuing Education	2019	<ol style="list-style-type: none"> 1. Know the principles of Management, Planning and Organizing capacity to conduct Adult Education Programmes. 2. Develop Social and Communication Skills to organize village, Mandal, District, State and Central level programmes. 3. Acquire project techniques for sustainable programmes. 4. Learn and enhance research skills to write project report, monitoring and evaluation of data of Adult Education Programme.
12	MAAE-2.6	Human Values And Professional Ethics-Ii	2019	<p>Understand and recognize the importance of Value Education & Human Values and also try to follow the traditional values of family, women and elders in the society.</p> <p>2: Examine code of ethics for medical and health care professionals. They Can sensitize the rural people on Health Issues & Problems.</p> <p>3: Explain the Environmental Protection and relationship between Man and Nature, causes of pollution and impact on environmental health.</p> <p>4: Recognize the need of Social ethics and fight against the anti-social activities, Organ trade, Human trafficking etc.</p>
13	MAAE-3.1	Training In Adult And Continuing Education	2019	<ol style="list-style-type: none"> 1. Identify the importance of training in Adult and Continuing Education programmes and differences between training and education. 2. Know the training methods, training materials to organize the Adult and Continuing Education programmes. 3. Follow the teaching methods like Lecture,

				discussion, demonstration and Role Play methods. 4. Recognize training facilities at different levels like National, State, District and Local.
14	MAAE-3.2	Comparative Studies In Adult Education	2019	1: Compare the Adult Education Programmes of different countries based on its aims and significance. 2: Compare and contrast of Adult Education movement and progress in different countries like UK, USA, Denmark etc with reference to India. 3: Find out the similarities and dissimilarities of Adult Education Programs in selected countries. 4: Identify the problems of Adult Education in terms of Planning, Organization and Budget activities in developing countries and India.
15	MAAE-3.3	Material Development For Adult And Continuing Education	2019	1. Identify the significance of learning materials in Adult Education classes. 2. Design the teaching learning activity objectives for better performance of Teacher educator in Adult Education Programmes. 3. Enhance language forms and competence and tune with the needs of the learner. 4. Develop teaching learning materials for self-learning
16	MAAE-3.4a	Peoples' participation And Development	2019	1. Analysing the role and functions of people committees, 2. Understanding the functions of Panchayat Raj institutions. 3. Knowledge on the role of co-operatives in rural development.

				4. Ability to catalyse the performance of PRIs and co-operatives.
17	MAAE-3.4b	Vocational Education And Skill Development	2019	<ol style="list-style-type: none"> 1. Identify the relationships of Vocational Education and Adults development. 2. Understand the institution training importance and its practices in vocational training. 3. Identify the issues of Rural Vocational training in India and Asian Countries. 4. Provide Vocational Guidance and Counselling for Adult trainees.
18	MAAE-3.4c	Guidance And Counselling In Adult And Continuing Education	2019	<ol style="list-style-type: none"> 1. Remembering the concept and theories and perspectives of guidance and counselling in educational process. 2. Recollecting understanding and analysis of educational problems of a clientele group. 3. Knowing the roles and functions of guidance counsellor. 4. Analysing the use of computers and internet in guidance and counselling.
19	MAAE-4.1	Monitoring And Evaluation	2019	<ol style="list-style-type: none"> 1. Identify the concept of monitoring and monitoring systems in adult education 2. Describe the different evaluation models. 3. Demonstrate the tools and techniques of evaluation. 4. Understand the importance of learner evaluation.

20	MAAE-4.2	Human Resource Development And Management In Lifelong Learning	2019	<ol style="list-style-type: none"> 1. Understand the importance of human resource development and its historical background. 2. Analyze the human capital and its functions in Adult Education. 3. Explain the cost benefit process and problems of measurements. 4. Identify the need of planning in human resource development and relation to Adult Education.
21	MAAE-4.3a	Environment And Education	2019	<ol style="list-style-type: none"> 1. Understand the fundamental aspects of environment and need of environmental protection. 2: Interpret the environmental crisis with reference to pollutions and its impact of human life need of Environmental Conservation. 3: Know the environmental laws and role of individual and community to Control environmental pollution. 4: Explain Ecology and eco factors for Ecological Balance.
22	MAAE-4.3d	Population Education	2019	<ol style="list-style-type: none"> 1. Recollecting the concepts, needs and importance of population related terminologies. 2. Analysing the causes and consequences of population growth. 3. Distinguishing the roles of different agencies in promotion of population education and control. 4. Identifying the different National population policies and influences fertility, mortality and migration.

23	MAAE-4.4	Dissertation / Project Work	2019	<p>Application of knowledge and skills in project designing</p> <p>2.Ability to do research work.</p> <p>3.Finding solutions to the problems identified in his research work.</p> <p>4.Preparing the research report.</p>
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2. Ancient Indian History, Cultural Archeology

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes

1	AIHC&A- 101	History of Ancient India upto 550 A.D.	2019	<p>Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto 550 C.E.</p> <p>Student will also be well versed with different analytical approaches and models of interpretation.</p>
2	AIHC&A- 102	History of India from 1206 A.D. to 1526 A.D.	2019	<p>Students can familiarize in understanding the continuity with changes in all spheres of history and culture under the Delhi sultanates.</p> <p>Students can able to assess the contribution of sultanates to Indian culture and impact of</p> <ul style="list-style-type: none"> ➤ Islamic institutions on Indian culture

3	AIHC&A- 103	History of Andhras upto 1323 A.D.	2019	<p>The study of comprehensive history of the country is incomplete without the study of regional history.</p> <p>Regional history is becoming more and more popular, for it has the potential of tapping varied kinds of sources for understanding the divergent aspects of local heritage and culture.</p> <p>The students can develop thorough understanding on Ancient Andhra history and culture.</p>
4	AIHC&A- 104	Ancient World Civilizations.	2019	

5	AIHC&A- 105	(A)Principlesand Methodsof Archaeology.	2019	<p>Students can develop a strong foundation on the basic understanding of the nature, fundamentals,developmentandvalueof archaeologyasadiscipline.</p> <p>Familiarizedwithbasicdescriptivetechniqueandpreliminary study ofvariouscategoriesof objectsandthepractical methodsofdoingArchaeologicalwork</p>
6	AIHC&A- 105	(B)Advanced Archaeological Theoryand Research Methodology	2019	

7	AIHC&A- 106	(A) Social and Political Institutions in Ancient India	2019	<p>Students get acquainted with various developmental phases of the Indian social institutions and their significance in human life and values</p> <p>It helps to understand the concepts of Political institutions in Ancient India and their significance.</p>
8	AIHC&A- 106	(B) Indian Religious Movements.	2019	<p>The students can be able to understand well the origin and development of various religious movements and spiritual heritage of India</p> <p>Students also familiarise with the complex religious system in India, their practices and reforms</p>
9	AIHC&A- 107	Human Values and Professional Ethics- I.	2019	<p>Students can understand the need and importance of human values and professional ethics which are essential for positive human behaviour and actions in our daily lives.</p> <p>They inspire the fundamental goodness of human beings and society at large.</p>

10	AIHC&A- 201	History of India from 550 A.D. to 1206 A.D.	2019	<p>Students can develop comprehensive knowledge on political, social, economic, religious and cultural history of early medieval India, regional polities and its impact</p> <p>Students can also be able to understand the circumstances leading to the invasion of</p> <p>Arabs and foundation of Muslim rule in India.</p>
11	AIHC&A- 202	History of Medieval India from 1526 A.D. to 1707 A.D.	2019	<p>Students can understand thoroughly the Mughal conquest of India, their rule and legacy.</p> <p>The study helps the students to assess the achievements and contribution of Mughals to Indian history and culture</p>

12	AIHC&A- 203	History of South India from 1323 A.D. to 1724 A.D.	2019	<p>This course provides comprehensive knowledge on the imperial political formation in South India and the history of Vijayanagara, Bahmani and contemporary powers.</p> <p>It helps to understand with the context of polity, economy, culture, religious and ideological changes.</p>
13	AIHC&A- 204	Pre and Proto Historic Cultures of India	2019	<p>Students will develop a strong foundation and critical understanding of the pre- proto cultures of India</p> <p>They will be able to situate Indian materials within wider archaeological debates.</p>

14	AIHC&A- 205(A)	(A)Historyof IndianArchaeology	2019	
15	AIHC&A- 205(B)	(B)Cultural Heritage Management	2019	<p>Studentscanunderstandwelltheconceptofculturalhe ritage,worldandheritage monumentsinIndia</p> <p>Canacquiretheknowledgeabouttheneedoftheircons ervationandpromotionof awarenessamongthepublic.</p>

16	AIHC&A- 206(A)	(A)India's Early Cultural Contacts withotherCountries	2019	
17	AIHC&A- 206(B)	(B)EarlyHistoryof SouthEastAsia	2019	<p>StudentscanbeabletounderstandthoroughlytheEarly HistoryofSouthEast Asia,</p> <p>thecontactsbetweenIndiaandSouthEastAsiainterms ofCultural,religionsand economicexchanges</p> <p>Studentcanbewellversedinassessingthe India'searlyculturalcontactsandits influenceinSouthEastAsia</p>

18	AIHC&A -207	Human Values and Professional Ethics- II	2019	<p>Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives.</p> <p>They inspire the fundamental goodness of human beings and society at large.</p>
19	AIHC&A- 301	History of Indian Architecture	2019	<p>Students will be able to understand the evolution of architecture in India and their transformation through the ages in their religious, regional and stylistic context.</p> <p>Can gain theoretical knowledge about the basic philosophy, fundamental aspects and multifaceted nature of Architecture.</p>

20	AIHC&A- 302	Epigraphy	2019	<p>Students will be able to understand the profession knowledge on decipher and read scripts; assess the date of inscriptions with the help of paleographic features.</p> <p>Able to understand the different languages used in inscriptions, interpret the inscription in its Political.</p> <p>Socio-economic and Religious context.</p>
21	AIHC&A- 303(A)	(A) History of Modern Andhra from 1724 A.D. to 1956 A.D.	2019	<p>The students can understand the history of Andhra as well the history of Hyderabad state under company and crown rule.</p> <p>Assess the role of Andhra in the freedom movement</p> <p>Acquire thorough knowledge on the causes and course of the movement of separate Andhra state, movement for formation of Andhra Pradesh</p>

22	AIHC&A- 303(B)	(B)Historiography andHistorical Method	2019	<p>Itprovidesacriticaloverviewofoneofthemostdynamicareasofmodernhistoricalinquiry—</p> <p>globalhistory.</p> <p>Thestudentscanfamiliarizewithhistoricalstudies,thetheoriesandmethodsusedinthepracticeof historywriting.</p> <p>Students alsogainfoundationknowledgeonHistoricalMethodsandfundamentals of research</p> <p>methodology</p>
23	AIHC&A- 303(C)	(C)Laboratory Methods in Scientific Archaeology	2019	<p>StudentsarefamiliarizedwithbasicdescriptivetechniqueandPreliminarystudyof</p> <p>variouscategoriesofobjectsstudied</p> <p>byarchaeologists,suchas lithics,pottery, plant</p> <p>fossils,humanremains,rocksand</p> <p>minerals sediments,mapreading</p>

24	AIHC&A- 303(D)	(D)TempleStudies	2019	
25	AIHC&A -304	SoftSkillsin Archaeology	2019	<p>The students can acquire knowledge on the basics of computer and its usage in general</p> <p>They can expertise the working skills in computational archaeology and be able to equip for future research and enhance employability.</p>

26	AIHC&A- 305(A)	(A)Outlinesof IndianHistory	2019	Thenon- historystudentsasanexternalelectivec oursebecomefamiliarin understandingthebroadphasesofIndi anhistoryandculture
27	AIHC&A- 305(B)	(B)Womenin IndianHistory	2019	Thestudentscanacquireknowledgecourseonthesou rcesforthestudyofwomen history,theirroleinsocialandreligiousmovement ssincetheages,progressof education,economy,theirroleinculturalinstitutio nsandanalyseswomencentered issueswithhistoricalcontext.

28	AIHC&A- 401	Historyof IndianArt	2019	Studentsbecomefamiliarwiththemonumentsandthei rsculptures,artforms, features,stylesandartschoolsofIndiaduringthepe riodcoveredinthecourse.
29	AIHC&A- 402	Numismatics	2019	Studentswillbeabletoidentifyanddecipherthecoins. Theywillalsobeabletounderstandthesocio- politicalbackgroundthataccurse throughthecoinageofthattime;thusgettingholistic pictureofeconomicand monetarysystemprev alentinancientand medievalIndia

30	AIHC&A- 403(A)	(A) Museology	2019	<p>Students can learn the basic nature, functions of museums and their activities.</p> <p>The students were able to acquire the essential skills and knowledge needed for Museum profession.</p>
31	AIHC&A- 403(B)	(B) Historical Applications in Tourism	2019	<p>The students can familiarize the knowledge needed to excel in tourism activities.</p> <p>It will equip the students with the solid foundation to build upon the fundamentals, useful skills and expertise that can assist employment in Tourism Industry</p>

32	AIHC&A- 403(C)	(C)Tour Guidingand Management	2019	<p>Thestudentscanfamiliarizetheknowledgeneed edto tourismguideactivities.</p> <p>Itwillequipthestudentwiththesolidfoundationto build uponthefundamentals of tourguide,usefulskillsand expertisethat canassistemployment inTourism Industry</p>
33	AIHC&A- 403(D)	(D) Conservationof Cultural Property	2019	<p>The student can equip with various methods and techniques followed in the</p> <p>ConservationandPreservationofCulturalProperty.</p> <p>Thestudents wereabletopossess theessentialskillsandknowledge thatcanassist employmentin Archaeologyand museumasconservator</p>

34	AIHC&A- 404	History of Science and Technology in Ancient India	2019	<p>Students will be able to understand the history of science and technology and its progress through the ages, introduction and impact of the stone and metal ages and nature of scientific developments in ancient India.</p> <p>They also acquire the knowledge on the history of Mathematical Sciences and</p>
35	AIHC&A- 405(A)	(A) Introduction to Indian Archaeology	2019	<p>The external elective students can acquire the knowledge about the importance of archeological studies, its relevance to other sciences.</p> <p>Will become familiar to understand the importance of epigraphy and numismatics in the reconstruction of history</p>

36	AIHC&A-405(B)	(B)Historyof Vijayanagara Empire	2019	The non-history student as an external elective can familiar in understanding the history of Vijayanagara empire and their contribution to south Indian culture
37	AIHC&A-304(B)	b) Social and Political Institutions in Ancient India	2019	<ul style="list-style-type: none"> ➤ The student will be able to understand the basic features of various theories and thoughts used in archaeological interpretations. ➤ They can formulate a research proposal and decide on appropriate materials and methods of analysis. ➤ They can present the findings and the process of conducting research in written and verbal formats.
38	AIHC&A-305(A)	a) Outlines of Indian History	2019	<ul style="list-style-type: none"> ➤ The non-history students as an external elective course become familiar in understanding the broad phases of Indian history and culture

39	AIHC&A-404(B)	b) India's Early Cultural Contacts with other Countries	2019	<ul style="list-style-type: none"> ➤ Cross regional cultural diffusion has been an important aspect of historical evolution. ➤ A strong and vibrating civilization having its impact felt upon other contemporary cultures has been a common phenomenon of history ➤ The students were able to understand the influence of Indian culture on Central Asia, south east asia, Japan, Tibet, Persia, Greece, Rome, Indo- China
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3. Area Studies Programme

S.No	Course Code	Name of the Course	Year introduction	of Course Outcomes
1. 1	SEAPS-101	Early Cultural History of Southeast Asia	2019	<ol style="list-style-type: none"> 1) Students understand the causes for the spread of Indian culture in Southeast Asia. 2) Know the different Indian dynasties of the past in Southeast Asia. 3) Students will be able to learn the impact of Indian cultural on Southeast Asian societies

2.	SEAPS-102	Regional Geography of Southeast Asia	2019	<p>1) Students understand geographical profile of different countries of Southeast Asia.</p> <p>2) Know the trends in population movement within Southeast Asia.</p> <p>3) Students will be able to assess location significance and various infrastructural developments.</p>
3.	SEAPS-103	Colonization of Southeast Asia	2019	<p>1) Students will have adequate knowledge on rise and fall of Portuguese</p> <p>2) Students differentiate the colonial powers that ruled Southeast Asia</p> <p>3) Critically observe Thailand's Political, Economic transformation and maintaining independence</p>
4.	SEAPS-104	Ancient Indian History up to 1206 A.D.	2019	<p>1) Students comprehend ancient Indian History, Indus Valley Civilization, Vedic Culture and Jainism and Buddhism.</p> <p>2) Know the rise of different Dynasties and contribution to Indian Culture.</p>

5.	SEAPS-105	Modern European History, 1870-1991	2019	<p>1) Differentiate volatile political situation in Europe</p> <p>2) Earn broad understanding of Bismarck and consolidation of the Germany.</p> <p>3) Understand global politics in the two world wars and the cold war</p>
6.	SEAPS-106	Human Values and Professional Ethics-I	2019	2)
7.	SEAPS-201	Contemporary Cultural History of Southeast Asia		<p>Students list the Christian Missionary activities in Southeast Asian countries.</p> <p>2) Knows the factors of Indian Emigration, and Chinese economic contribution in Southeast Asia.</p> <p>3) Comprehensive grasp over different cultures and religions in Southeast Asia</p>

8.	SEAPS-202	Modern History of China, 1839-1976		<p>Students know Western contacts, rebellions and reforms in China</p> <p>2) Advanced understanding on Sun Yat Sen, Chiang Kai-Shek and Mao Tse-Tung</p> <p>3) Distinguish Reconstruction and Consolidation of China and its foreign relations</p>
9.	SEAPS-203	Regional Geography of South Pacific & East Asia		<p>1) Students identify physical setting, landforms, climate and soils of South Pacific.</p> <p>2) Comprehend on Australia, New Zealand, Japan and China</p> <p>3) Recognize the economic trends in South Pacific and East Asian nations</p>
10.	SEAPS-204	Medieval Indian History 1206 A.D.– 1707 A.D		

11.	SEAPS-205	Modern Indian History 1757-1965		<p>1) Students understand Indian sub-Continent and the Europeans arrival</p> <p>2) Students distinguish the causes for the rise of nationalism and various phases of Independence movement.</p> <p>3) Gain adequate knowledge on Gandhian Era, Independence and post independent-India</p>
12.	SEAPS-206	Human Values and Professional Ethics-II		3)
13.	SEAPS-301-A	a) Nationalism in Southeast Asia		
14.	SEAPS-301-B	b) Indochina (Cambodia, Laos & Vietnam) 1802-2000		<p>Students will learn early Western contacts and establishments of French protectorates over Indochina states.</p> <p>2) Gain knowledge on French Administration and freedom movements in Indochina.</p> <p>3) Knows global politics during Cold War and its</p>

15.	SEAPS-301-C	c) Geopolitics of Asia-Pacific Region		<ul style="list-style-type: none"> 1. Students will understand the meaning of geopolitics 2. Essence of Cold War will be understood thoroughly 3. Will learn about Post Cold War politics
16.	SEAPS-302-A	a) Modern History of Japan 1854-1975		<ul style="list-style-type: none"> 1) Students acquaint knowledge on Opening of Japan and its early western contacts. 2) Knows Japan's militarization, Russo Japanese war and the First World War 3) Gain knowledge on US Occupation of Japan and Post World War-II developments and
17.	SEAPS-302-B	b) East Asian Developments – Post Cold War		
18.	SEAPS-302-C	c) Indian Diaspora		<ul style="list-style-type: none"> 1) Know the reasons of Indian migration to Southeast Asian countries. 2) Learn Indian migrant's socio-economic contribution to host nations. 3) Focus on the role of Indian Diaspora in National Reconstruction and image building in host countries.

19.	SEAPS-302-D	d) International Relations		<p>1) Students know the meaning, nature and scope of International Relations</p> <p>2) Gain knowledge on the Cold War and New International Economic Order.</p> <p>3) Acquainted with the foreign policies of various countries: and</p>
20.	SEAPS-303-A	(a) India and the World		<p>1) Develop understanding of Non-Aligned Policy under Jawaharlal Nehru and Indira Gandhi</p> <p>2) Build knowledge on India's Role in the United Nations</p> <p>3) Advance understanding on India's relations with the US, Russia, the Arab World and the European Union</p>
21.	SEAPS-303-B	(b) Emerging Asia and the World		<p>Develop understanding of Economic and Social Progress in Asia and also Economic crisis and Recovery of Asia</p> <p>2) Comprehensive grasp over Foreign Direct Investments in Asia, Rise of China and also about India's Look East Policy.</p> <p>3) Comprehend on Regionalism and regional organizations like ASEAN and SAARC.</p>
22.	SEAPS-401-A	a) Regional Cooperation in Southeast Asia		<p>Students learn about early organizations like ASA, SEATO and MAPHILINDO.</p> <p>2) Develop understanding on the evolution of ASEAN from 5 to 10 members</p> <p>3) Focus on the ASEAN Summit Meetings, ARF and AFTA</p>

23.	SEAPS-401-B	b) Economic Landscape of Asia-Pacific		<p>Develop an understanding of the rise of industrial economies like Singapore, Malaysia, Thailand and Indonesia.</p> <p>2) Comprehend of the economies of Australia and New Zealand.</p> <p>3) Ability to know the Regional Economic Groups like ASEAN, ESCAP, APEC and EAS.</p>
24.	SEAPS-401-C	c) Energy, Environment and Sustainable Development		
25.	SEAPS-402-A	a) Post-Cold War World order		
26.	SEAPS-402-B	b) South Pacific Cultures		<p>1. Students will learn about the definition of culture</p> <p>2. Will be able to learn about different societies in South Pacific</p> <p>3. Can identify different ethnic minorities in South Pacific</p>

27.	SEAPS-402-C	c) Developing Blue Economy		<p>1) Acquainted with the Blue Economy, Marine Governance and Ocean Technologies.</p> <p>2) Gain knowledge on ports and shipping, oceanic resources and marine bio-technology.</p> <p>3) Develop an understanding on Renewable Ocean Energy and its Importance.</p>
28.	SEAPS-402-D	d) History of the USA from 1766-1963		<p>1. Learn about American war of Independence</p> <p>2. Develop knowledge on the roles of Presidents of the USA</p> <p>3. Learn the causes for the Civil War, Abraham Lincoln and era of American Imperialism.</p>
29.	SEAPS-403-A	(a) India-Australia Relations		<p>1) Learn about Littoral States of Indian Ocean and Complementarities between India-Australia</p> <p>2) Ability to analyze Political Issues and security concerns of both nations.</p> <p>3) Comprehend on the Post Cold War initiatives, strategic and security concerns.</p>
30.	SEAPS-403-B	(b) History of Modern Andhra Pradesh 1800-1956		<p>1. Students will learn about different dynasties that ruled Andhra Region</p> <p>2. Formation of Andhra in 1953 will be studied</p> <p>3. Students will study about Jai Andhra Movement</p>

TOURISM:

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	T 101	Theoretical Concepts of Tourism	2019	<ol style="list-style-type: none">1) Understand the Nature, Meaning and Scope of Tourism.2) Students understand the different aspects in tourism.3) Earn knowledge about national and international tourism organisations
2	T 102	Planning and Development of Tourism	2019	<ol style="list-style-type: none">1. Learn about organized planning in the tourism industry.2. Gain knowledge on the resolutions of state governments towards tourism in their states.3. Know the significance of planning policies of
3	T 103	Indian Heritage and Culture	2019	
4	T 104	Art and Architecture of North India	2019	<ol style="list-style-type: none">1) Understand briefly the different art forms in India.2) Students understand and distinguish different types of architecture.3) Learn about most famous forts and palaces in India.

	T 105	Cultural Tourism in India		<p>1) Students gain knowledge on Indian culture .</p> <p>2) Evaluate the cultural resources to utilize as a tourism products. .</p> <p>3) Interpret the techniques of handicrafts.</p>
	T 106	Human Values and Professional Ethics		1)
	T 201	Historical Application of Tourism in India		<p>1) Students know historical development of tourism in India</p> <p>2) Categorize important tourism linkages and destinations.</p> <p>3) Gain knowledge on major tourist circuits</p>
	T 202	Tourism Management		<p>1) Demonstrate managerial skills and to manage the Tourism environment</p> <p>2) Apply the marketing skills and understanding demand and supply.</p> <p>3) Acquire skills of using Human Resources in</p>

	T 203	World Tourism Geography		
	T 204	Art and Architecture of South India		<ol style="list-style-type: none"> 1) Understand briefly the different art forms in India. 2) Students understand and distinguish different types of architecture. 3) Learn about most famous forts and palaces in India.
	T 205	Cultural Tourism in Andhra Pradesh		<ol style="list-style-type: none"> 1) Understand culture and Cultural impacts of Andhra People 2) Students understand culture and life style of Andhra. 3) Learn about performing arts and cultural contribution of various dynasties. .
	T 206	Human Values and Professional Ethics II		2)

	T 301	Travel Agency and Tour Operations Management (TMP)		
	T 302	Emerging Trends in Tourism (MP)		<ol style="list-style-type: none"> 1) Students will learn about different types of Tourism. 2) Build an Understanding of socio, cultural and economic impacts of tourism. 3) To learn Tourism related laws, responsibilities and different acts related to tourism.
	T 303	Airline Ticketing and Information Management (MPJ)		<ol style="list-style-type: none"> 1) Students know about IATA and its functions 2) Gain knowledge and use of information technology in tourism industry 3) To know about tour office management skills and tour desks.
	T 304 a	Tourism Research Methods (GVKR)		<ol style="list-style-type: none"> 1) To make the student understand the scope of research in tourism sector. 2) Students learn different techniques used in Research for tourism sector. 3) Gain knowledge in presentation of research findings and

	T 304 b	Transport Management (ALC)		<ol style="list-style-type: none"> 1. Students will understand the role of Transport in Tourism 2. Gain knowledge on the importance of manpower in Transport Business 3. Comprehend the students how Transport Management is essential in Tourism.
	T 304 c	Communicative English for Tourism and Hospitality		3)
	T 304 d	Tour Guide		4)
	T 305 a	Heritage Management		5)

	T 305 b	Tourism Economics (VRB)		<ol style="list-style-type: none"> 1) Students learn the concepts of demand and supply in tourism. 2) Assess the impact of tourism on environment, social and political. 3) To evaluate the role of public and private sectors and
	T 401	Tourism Marketing		<ol style="list-style-type: none"> 1) Students acquire knowledge on the tourism needs and demands. 2) To know different types of marketing strategies related to the tourism industry. 3) Students acquire different types of skills pertaining to tourism sector
	T 402	Tourism and Hospitality Management		<ol style="list-style-type: none"> 1 Student will be in a position to distinguish between different types of accommodations in the hotel industry. 2 Will realize the importance of hospitality in the tourism sector.
	T 403	Environment and Tourism		<ol style="list-style-type: none"> 1. Learn about the wildlife Sanctuaries 2. Gain knowledge on environment and management of Eco Systems. 3. Comprehend the Global climate policies

	T 404 a	Health and Medical Tourism		<ol style="list-style-type: none"> 1. Develop understanding of medical tourism, its development over ages as an industry 2. Learn the role of government and private sectors in promotion of Medical Tourism
	T 404 b	Dissertation + Viva		6)
	T 404 c	German Language		7)
	T 404 d	Hindi Language		8)

	T 405 a	Adventure Tourism		<p>1. Explain the status and scope for adventure tourism in India.</p> <p>2. Learn different types of adventure tourism</p> <p>3. Evaluate the role of government and other stakeholders in adventure tourism.</p>
	T 405 b	Event Management		<p>1) Know the types and importance of event management.</p> <p>2) Understand the managerial and operational aspects pertaining to the MICE</p>

4. Centre for Womens Sudies

S.No	Course Code	Name of the Course	Year introduction	of Course Outcomes
1	SVUWS101	Women's Studies- concepts, Principals & Issues	2019	<p>Define the concept of women studies and its evolution over a period time;</p> <p>Understand the concept of status of women and factors influencing the status of women in India;</p> <p>Analyse the institutions of Family and Marriage and their</p>

2	SVUWS102	Health and Nutritional perspectives of women	2019	<p>Understand the interrelationship between the nutrition and health and the health status of women and children in India;</p> <p>Analyse the impact of various nutritional programmes being implemented in India to improve the health status of women</p>
	SVUWS103	Entrepreneurship Management & Development		
	SVUWS104	Computer Applications: MS-Word, MS-Excel,		•
	SVUWS105	5a. Gender, environment, climate change & livelihood (Opt-1) 5b. Gender Society		•
	SVUWS106	6a. Human Values And Ethics-I 6b. Leadership values Opt-1		•
	SVUWS201	Women & Development		•
	SVUWS202	Research methodology & SPSS		•

	SVUWS203	Sales and Marketing Management with focus on Gender perceptions		•
	SVUWS204	Skills Development Training – C Language,		•
	SVUWS205	5a. Capacity building and leadership Training		•
		5b. Gender & Media		•
		5c. Social Work initiatives for women's development		•
	SVUWS206	6a. Human values & Professional Ethics – II		•
		6b. Familial values and Ethics		•

	SVUWS301	Gender, Science & Technology		•
	SVUWS302	C++ & E-Commerce		•
	SVUWS303	Human Resource planning & Development With focus on Gender perceptions		•
	SVUWS304	NGO Management		•
	4a			
	4b	Guidance & Counseling With Gender Perceptions.		•
	4c	Feminist theories, Women's, Status & Empowerment.		•
	4d	Women's participation in Agriculture & Allied sectors		•

5a	SVUWS305	Gender Sensitization & Training		•
5b		Gender Identity and Leadership		•
5c		Women and Governance		•
	SVUWS401	Documentation & Project Work with Gender perception		•
	SVUWS402	Accounting & Financial Management, Tally		•
	SVUWS403	Participatory learning, Extension & outreach programs & Advocacy with		•
4a		Legal and Human Rights of Women		•

	4b	HumanResourceManagement WithfocusonGender perceptions		•
	4c	Multimediasystems		•
	4d	ReproductiveHealthandF amilyL ifeEducation		•
	SVUWS405 5a	Women&Globalization		•
	5b	Technicalcommunica tionand computerethics		•
	5c	Gender&MassCommunica tion		•

5. Econometrics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	EMT 101	Microeconomic Theory I	2019	<ul style="list-style-type: none"> • The microeconomic theory is to analyze how individual decision-makers, both consumers and producers, behave in a variety of economic environments. • The common goal in all of these issues is to identify the incentives of the various participating agents and the trade-offs that they face. • Microeconomics is a branch of economics that studies the behavior of individuals and firms in making decisions regarding the allocation of scarce resources and the interactions among these individuals and firms. • Microeconomics shows conditions under which free markets lead to desirable allocations. • The fundamental concepts of supply and demand, rational choice, efficiency, opportunity costs, incentives, production, profits, competition, monopoly, externalities, and public goods will help you to understand the world around you.

2	EMT 102	Macroeconomic Theory I	2019	<ul style="list-style-type: none"> • Define and explain the process of calculating national income, identify its components, demonstrate circular flow of income, analyse the various income identities with government and international trade, define the concept of green accounting. • Understand Say's law of market, classical theory of employment and Keynes objection to the classical theory, demonstrate the principle of effective demand and income determination. • Explain the meaning of consumption function, relationship between APC and MPC, consumption and income, concept of multiplier and analyse the theories of absolute and relative income hypotheses. • Understand the relationship between investment and savings, demonstrate investment multiplier, and understand the meaning of MEC and MEI. CO5. Illustrate the meaning of interest, analyse the various theories of interest • The goals are supported by objectives such as minimizing unemployment, increasing productivity, controlling inflation, and more. The macro economy of a country is affected by many forces, and as such, economic indicators are invaluable to assessing different aspects of performance.
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3	EMT 103	Mathematical Methods	2019	<ul style="list-style-type: none"> • Formulate mathematical models describing the dynamics of economic systems. Demonstrate the role of quantitative techniques in the field of business/industry, illustrate different types of equations, solve equations and system of equations, understand the concept of sets, illustrate and apply basic set operations. • Explain the rules for calculating derivatives, uses and application in calculating inter-relationship among total, marginal and average cost and revenue, calculate maxima, minima, elasticity, decide the optimal level of production for a firm. • Demonstrate the rules for calculating integration, describe the importance and application of integration in consumers' and producers' surpluses, total revenue and cost. • Illustrate matrix operation, minors, cofactors, use cofactor method to find inverse of a matrix, use Cramer's rule to solve systems of equations. • Students will get to learn applications of mathematical tools to economy.
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4	EMT 104	Practical I	2019	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 Able to find Inverse of a Matrix, System of Simultaneous Linear Equations and Cramer's Rule method.</p> <p>CO5 Student can identify the relationship between the economic variables and test their significance which is key factor for economic analysis and policy making or business decisions.</p>
5	EMT 105	StatisticalMethods	2019	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis.</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 formulate Statistical Methods describing the dynamics of economic systems such as production function analysis and solve econometric analysis of underlying data use with knowledge advanced econometric tools and techniques can solve easily.</p> <p>CO5 Student can identify the relationship between the economic variables and test their significance which is key factor for economic analysis and policy making or business decisions.</p>
6	EMT 106	HumanValuesandProfessiona IEthics-I	2019	
7	EMT 201	MicroeconomicTheoryII	2019	<p>Course Objectives: The microeconomic theory is to analyze how individual decision-makers, both consumers and producers, behave in a variety of economic environments. The factor prices</p>

8	EMT 202	MacroeconomicTheoryII	2019	<p>CO1 The overarching goals of macroeconomics are to maximize the standard of living and achieve stable economic growth</p> <p>CO2 The goals are supported by objectives such as minimizing unemployment, increasing productivity, controlling inflation, and more.</p> <p>CO3 The macro economy of a country is affected by many forces, and as such, economic indicators are invaluable to assessing different aspects of performance.</p> <p>CO4 Meaning and Types of Inflation – Demand-Pull inflation – Cost-Push Inflation – The Phillips curve – The Inflation – Unemployment trade-off.</p> <p>CO5 Objectives of Macroeconomic policies – Objectives of Monetary policy. New-classical and Real Business cycles Theorem – Post-Keynesians - Implications for Stabilization Policies.</p>
9	EMT 203	BasicEconometrics	2019	<p>CO1 Adequate competency in the frontier areas of economic theory and methods.</p> <p>CO2 Formulation and estimation of a multiple regression model.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all models</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Estimation of system of equations, estimation of panel data models, generalized method of moments, discrete response models, censored regression models and estimation of average treatment effects.</p>

10	EMT 204	Practical II	2019	<p>CO1 Students can Identify Inter industrial relationships using Input-output analysis,</p> <p>CO2 analyse maximization of profits and minimization of costs can evaluate using Linear Programming,</p> <p>CO3 Analyse relationship of economic variables using simple and multiple regression models which are covered in basic Econometrics</p> <p>CO4 Able to estimate and interpret linear regression models and be able to distinguish between economic and statistical importance</p> <p>CO5 They should be able to critique reported regression results in applied academic papers and interpret the results for someone who is not trained as an economist.</p>
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11	EMT 205	Mathematical Economics	2019	<p>CO1 Students can deal Mathematical calculation of static optimization, Application of Lagrange's method and also student can evaluate Differential Equations and with Economic Applications.</p> <p>CO2 Able to estimate and interpret Inter industrial relationships using Input-output analysis, also analyse maximization of profits and minimization of costs of the firms using Linear Programming method</p> <p>CO3 Economic Applications of Differential Equations – Dynamic Multiplier – Harrod-Domar Model.</p> <p>CO4 Homogeneous Linear Difference Equations with Constant Coefficients – Particular Solution of Non-homogeneous Linear Equations – Linear First Order and Second Order Difference Equations with constant coefficients – Cobweb Model –Market model with Stocks</p> <p>CO5 Formulation of LPP – Basic and Feasible Solutions – Graphical Solution - Simplex Method – Duality in Linear Programming – Elements of Data envelop Analysis and its Applications.</p>
12	EMT 206	Human Values and Professional Ethics II	2019	

13	EMT 301	<i>Indian Economy</i>	2019	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources. Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, make in India etc</p> <p>CO4 Students will get benefit about various economic issues at local, national and global level.</p> <p>CO5 Grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.</p>
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14	EMT 302	<i>EconomicsofInsurance</i>	2019	<p>CourseOutcomes:Attheendofthecourse,thestudentwillbeableto</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development seminars, internships, and/or a practicums in insurance and risk management.</p> <p>CO5 Examine the role of public policy including social insurance in personal financial planning and risk management.</p>
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15	EMT 303	<i>Advanced Econometrics</i>	2019	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Concepts of Heteroscedasticity & Multicollinearity. Possible reasons behind the presence of Heteroscedasticity & Multicollinearity. Skill to judge the reliability of estimation in case of violation of basic assumptions for the application of ordinary linear regression method.</p> <p>CO2 Concepts of Autocorrelation reasons behind the presence of Heteroscedasticity & Multicollinearity. Describe the variance/covariance matrix for the regression errors under the assumption that the errors are correlated</p> <p>CO3 Apply modern econometric methods covering time series analysis, financial econometrics, microeconometrics, macroeconometrics and structural econometric modelling;</p> <p>CO4 Interpret and critically evaluate applied economics research literature; demonstrate programming skills and numerical methods; and</p> <p>CO5 Apply methods learned to address policy and business decision questions.</p>
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16	EMT 304	<i>Computer Applications and Data Analysis</i>	2019	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will get basic knowledge of computers i.e., block diagram, evolution of computer, input/output devices, storing information in computer etc.</p> <p>CO2 At the end of this course student will gain Examine spreadsheet concepts and explore the Microsoft Office Excel environment. Import and export data.</p> <p>CO3 Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas. Perform analysis tasks using Data analysis pack</p> <p>CO4 Student gained and evaluate Econometric Methods such as OLS, LPM, Logistic regression analyses and conclude using SPSS Package</p> <p>CO5 Finally, student will be able to write programme for Simple statistical analyse and interpret through R-programming.</p>
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17	EMT 305	<i>Public Finance</i>	2019	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Understand the sources of finance both public and private, demonstrate the role of government to correct market failures and possible advantage of public financing</p> <p>CO2 Attain the advantages and knowledge of public investments and other government expenditures. Understand the causes of growing public expenditures for various programmes and policies within and outside the country.</p> <p>CO3 Understand the possible burden, benefits and distribution of various types of taxes among various classes of people, know the general trend and impact on general welfare and arouse them to suggest good and bad tax system.</p> <p>CO4 Understand the needs of public borrowing from all possible sources to meet necessary public investment/expenditures. Also be alerted to find sources for repayment</p> <p>CO5 Deliver effectively the preparation of budget and how they are passed in the house. Understand the changes in size and flexibility of state and central budget along with the role played by Finance Commission.</p>
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18	EMT 306	<i>Financial Institutions and Markets</i>	2019	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Explain the broad features of Indian financial institutions with its apex banks' objectives and purview. Also understand the instruments to control credit in the country.</p> <p>CO2 Effectively narrate the kinds and components of money with its regulatory system, be aware of the functions, objectives and limitations of commercial banks.</p> <p>CO3 Identify the existence and development of non-banking financial institutions, know the important role of Mutual funds, LIC, investment companies etc., utilize and effectively participate in the development process.</p> <p>CO4 Understand the conditions of financial markets and its impact in the economy</p> <p>CO5 Demonstrate the role and significance of foreign exchange rate and its markets with its impact on various sectors in the economy.</p>
19	EMT 307	<i>Practical III</i>	2019	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Student will gain Examine spreadsheet. Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas.</p> <p>CO2 Perform analysis tasks using Data analysis pack using MS-Excel.</p> <p>CO3 Student gained and evaluate Econometric Methods such as OLS, LPM, Logistic regression analyse and conclude using SPSS Package</p> <p>CO4 Student will able to test of Multicollinearity, Heteroscedasticity and Autocorrelation.</p> <p>CO5 Student will be able to write programme for Simple statistical analyse and interpret through R-programming.</p>

20	EMT 308	IntroductiontoEconometrics	2019	<p>CO1 students will have adequate competency in the frontier areas of economic theory and methods</p> <p>CO2 Use basic econometric estimation techniques such as Ordinary Least Squares to estimate bivariate and multivariate regression models.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all model.</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Students will acquire additional specialization topics are estimation of system of equations, estimation of panel data models, generalized method of moments, discrete response models, censored regression models and estimation of average treatment effects.</p>
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21	EMT 309	IndianEconomy	2019	<p>CourseOutcomes:Attheendofthecourse,thestudentwillbeableto</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources.Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, make in India etc</p> <p>CO4 Students will get benefit about various economic issues at local, national and global level.</p> <p>CO5 Grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.</p>
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22	EMT 310	EconomicsofInsurance	2019	<p>CourseOutcomes:Attheendofthecourse,thestudentwillbeableto</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development seminars, internships, and/or a practicums in insurance and risk management.</p> <p>CO5 Examine the role of public policy including social insurance in personal financial planning and risk management.</p>
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23	EMT 401	<i>International Trade and Finance</i>	2019	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Identify the basic difference between inter-regional and international trade, understand how international trade has helped countries to acquire goods at cheaper cost and explain it through the various international trade theories.</p> <p>CO2 Show the benefits of international trade in a way how nations with strong international trade have become prosperous and have the power to control world economy and how global trade can be one of the major contributors of reducing poverty.</p> <p>CO3 Explain how restrictions to international trade would limit a nation in the services and goods produced within its territories and at the same time explain that a rise in international trade is essential for the growth of globalization.</p> <p>CO4 Show the importance of maintaining equilibrium in the balance of payments and suggests suitable measures to correct disequilibrium as well.</p> <p>CO5 Be aware of the changes in the composition as well as direction of foreign trade after international trade and know the causes and effects of deficits in the balance of payments, measures adopted to correct the deficits and identify the need for having trade reforms.</p>
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24	EMT 402	<i>Environmental Economics</i>	2019	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Realize the importance and influence of environment on the economy including the quality of manpower. Arouse their feelings to make cleaner environment so as to achieve harmonious development.</p> <p>CO2 Understand that environmental problem is not the problem of a single country or region but a global problem/issue. Hence, policy formulation may be for all countries.</p> <p>CO3 Demonstrate the scientific management of waste materials; realize the role and importance of individuals to keep the environment clean.</p> <p>CO4 Understand the causes and victims of environmental pollution like poverty, population explosion, and over-use of resources, careless or unscientific dump/management of wastes.</p> <p>CO5 Suggest appropriate measures to correct environmental degradation, aware of those ingredients such as healthy climate, quality of human beings, domestic and other natural habitats and biodiversity levels, productivity and productions, sustainability, etc are all influenced by environment.</p>
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6. Economics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ECO-101 & 201	Micro Economics Analysis – I & II	2019	<ol style="list-style-type: none"> 1. Graduate Consulting Analyst. Graduate Recruitment Bureau. 2. Economic Consultant (Public Policy). 3. NERA Internship -Industry Research Analyst. Research

				Fellow. 4. Graduate Economic Consulting Internship, Economist, Customer Experience Strategy.
2	ECO-102 & 202	Macro Economics Analysis – I & II	2019	1. Work for a central bank of financial institutions. 2. Work as a consultants. 3. work in banking sector.
3	ECO-103&203	Public economics &Federal Finance	2019	1. Assistant commercial Tax Officers. 2. Industrial finance officers. 3. Bill collectors.
4	ECO-104&204	Mathematical Methods in Economics – 1and Statistical Methods in Economics	2019	1. Assistant Statistical officers. 2. Bossiness firm consultant. 3. Market research Analyst. 4. Financial analyst. 5. Investment manager. 6. International trade specialist.
5	ECO 105(a)	Fundamentals of Computer	2019	1. Digital Assistants. 2. Office Computer operators.
6.	ECO 105(b)	Urban Economics	2019	1. Senior urban economist. 2. International urban Economist. 3. Senior program Research analyst. 4. Urban environmental impact officer.
7.	ECO 105(c)	Welfare Economics	2019	1. Policy maker. 2. Administrator. 3. Welfare officer in Sachivalyam. 4. Admin in Sachivalayam.
8.	ECO 106(a)	Economics of Environment	2019	1. Environmental pollution officer. 2. Environmental consultants. 3. Environmental pollution planning and consultants. 4. Environmental conservation / Advocacy.
9.	ECO 106(b)	Demography	2019	1. National Sample Survey officers. 2. Census Survey Officers. 3. Chief planning officers.
10.	ECO 107	Human Values and Professional	2019	1. The student will be enriched with several aspects

		Ethics -I		<p>pertaining to Human values and performing of Professional Ethics in day today life.</p> <ol style="list-style-type: none"> 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
11	ECO 205(a)	International Trade: Theory and Policy	2019	<ol style="list-style-type: none"> 1. International trading officers. 2. Export and import Officers. 3. Shares consultants. 4. Commercial desk manager. 5. Global trade Advisory.
12	ECO 207	Human Values and Professional Ethics -II	2019	<ol style="list-style-type: none"> 1. Student will know the values of ethics in various fields including medical, social and business ethics. 2. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 3. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
17	ECO 301	Economics of Growth and Development	2019	<ol style="list-style-type: none"> 1. Project Coordinator. 2. Recreation manager. 3. Programme Director. 4. Social and community manager.
18	ECO 302	Indian Economy	2019	<ol style="list-style-type: none"> 1. NSSO. 2. Economic Survey directors.
19	ECO 304 (a)	International Finance	2019	<ol style="list-style-type: none"> 1. Financial Advisors. 2. Financial officers.
23	ECO 304	Communication and Soft Skills	2019	<ol style="list-style-type: none"> 1. Skill development coordinators. 2. Public relation officers. 3. Marketing and Advertising. 4. Media.

				5. Meeting and event planning.
26	ECO 401	Rural Development	2019	1. MGNREGA Programme officers. 2. District Coordinators. 3. Institutional building officers.
27	ECO 402	Financial Institutions and Markets	2019	1. Corporate finance. 2. Financial planning officers.
28	ECO 403 (a)	India's Economic Reforms	2019	1. Planning & Development Officers
29	ECO 404 (c)	Entrepreneurship and Skill Development	2019	1. Business consultant. 2. Research and development. 3. Recruiter. 4. Sales managers.
30	ECO 404 (d)	Labour Economics	2019	1. Labour officers. 2. Labour relations officers. 3. Labour relations assistant. 4. Construction estimators
31	ECO 305 (c)	Economics of Insurance	2019	1. Insurance Agents. 2. Loan processor. 3. Loss control officers. 4. Risk managers.
33	ECO 405 (a)	Human Resource Development	2019	1. Human resource recruiter. 2. Performance management and development. 3. Employees training officers. 4. Organizational development officers.

10. English

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1)	101	Poetry-I	2019	<ul style="list-style-type: none"> • An understanding of the evolution of English poetry across ages. • May inspire poetic creativity
2)	102	Drama-I	2019	<ol style="list-style-type: none"> 1.Perceive the nuances of performance 2.Recognize the transformation of human experiences into dramatic experiences.
3)		Fiction-I	2019	<ol style="list-style-type: none"> 1. Aesthetic and literary merits of the novel 2. The conditions of the age and the influence
4)	104	Prose-I	2019	<ol style="list-style-type: none"> 1. Understand the genre of essay 2. Imbibe the deeper human values implied in the essay.

5)	106	Human Values and Professional Ethics-I	2019	<ol style="list-style-type: none"> 1. Realize the necessity of practicing Human values and Ethics in all walks of life including the profession they opt for 2. Understand Bhagvad Gita as a guide for modern lifestyle
6)	201	Poetry-II	2019	<p>Sensitizes the students on the classical and contemporary poetic ethos</p> <p>Raises student awareness on movements like Modernism, War Poetry, Women's poetry, Symbolism etc,</p>
7)	202	Drama-II	2019	
8)	203	Fiction-II	2019	<ol style="list-style-type: none"> 1. The great works of major novelist of modern age 2. The ability to understand the technique of the Novel
9)	204	Prose-II	2019	<p>After the completion of the course the students are able to</p> <ol style="list-style-type: none"> 1. Know the working mechanism of Feminism and socialism 2. Know the mind and strategies of Victorian essayists 3. Know the importance of culture in the lives of Victorian people <p>Know the importance of being human in their dealings with the fellow beings</p>

10)	205	English Language Teaching	2019	<ol style="list-style-type: none"> 1. Understand the importance of language lab, teaching material and audio-visual aids in the learning and teaching of English. 2. Know to test and testing components of language tests examinations and evaluation procedures
11)	301	: Indian English Literature-I	2019	<ol style="list-style-type: none"> 1. Understand the Indian English writings and movements associated with it in India 2. Understand the merits of Indian English writings and drawbacks if any
12)	302	American Literature-I	2019	<ol style="list-style-type: none"> 1. An idea of English literature in America 2. Familiarity with the literary movements 3. Knowledge about concepts like Puritanism, transcendentalism, symbolism, impressionism etc
13)	303	Literary Criticism-I	2019	<p>Equips the student with the evolution of English Literary Criticism from Aristotle to early twentieth century</p> <p>Helps students map the genealogy of Western canonical critical texts</p>

14)	304 (A) 304(B) 304 (C) 305 (D)	Comparative Literature Short Story Women's Writings Indian Literature in English	2019	<p>1. Understand national and world literatures and the need of comparative studies in the global world.</p> <p>2. Understand the ways of comparative analysis</p> <p>OUT COMES: Perceives creativity as a tool of empowerment and unity amongst women. Understand gendered spaces in creativity and the genealogy of women's writings like Indian, African American, French etc.</p>
15)	305 (A)	Communicative English	2019	<p>.Understand the significance and importance of Communication in English in the present day world</p> <p>1. Understand communication process, the different types and barriers of communication</p>
16)	305(B)	English for Media	2019	<p>1. Understand the use of language in different situations in writing for the media</p> <p>2. Learn the oral skills necessary for media like interview skills</p>

17)	05(C)	3An Introductory Course to Literature	2019	<ol style="list-style-type: none"> 3. Understand the use of language in different situations in writing for the media 4. Learn the oral skills necessary for media like interview skills
18)	401	Indian English Literature-II	2019	<ol style="list-style-type: none"> 1. Understand the Indian English writings and movements associated with it in India 2. Understand the poetic features of Indian English poetry
19)	404(A) 404(B) 404(C) 404(D)	<p>Translation: Theory and Practice</p> <p>Subaltern Studies</p> <p>Post-Colonial Literatures</p> <p>World Classics in English Translations</p>	2019	<ol style="list-style-type: none"> 1. Know the concepts of dalitism, feminism, marginalism and Subaltern aspects with relevant theories 2. Appreciate and understand the struggles and sorrows of subalterns
20)	405(A) 405(B) 405(C)	<p>Soft Skills</p> <p>Indian Literature in English Translation</p> <p>Contemporary Translation Studies</p>	2019	<ol style="list-style-type: none"> 1. Will learn about morals and responsibilities 2. Learn to acquire the enduring values embedded in the great literary works of our writers

Linguistics

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Language and Linguistics	2019	<p>i.The students are understanding concepts of language modes and semiotic approaches.</p> <p>ii.The student are enriched in structure and concept of language.</p> <p>iii. The student clearly expresses grammatical analysis and linguistics and other fields.</p>
2	304E	Anthropological Linguistics	2019	<p>i Understanding anthropological linguistics and linguistic anthropology.</p> <p>ii. Identify ethnocentrism, ethnography in speaking and language ideology.</p> <p>iii. The students knows language and environment.</p>
3	305C	Linguistic Archaeology	2019	<p>i.Understanding the definition and scope of linguistic archaeology</p> <p>ii.The student will enrich in basic method of synthesis of evidences of archaeology , linguistics folklore etc.,</p> <p>iii. The student will able to explain historical linguistics and archaeology of South Asia.</p>
4	404E	Corpus Linguistics	2019	<p>i.Understanding the history and scope of corpus linguistics.</p> <p>ii.Gained knowledge in textual and electronic corpora.</p> <p>iii. Familiar with corpus antonation and analysis.</p>
5	405C	Machine Translation	2019	<p>i.Understanding history and problems of machine translation.</p> <p>ii.The students will able to understand</p>

				<p>approaches to MT.</p> <p>iii.The students are enriched in requirements for building MT systems and evaluation of MT systems.</p>
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13. History

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	HST 101	History of India Up to 650 A D	2019	<ul style="list-style-type: none"> ➤ Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto650 C.E. ➤ Student will also be well versed with different analytical approaches and models of interpretation
2	HST 102	History of Indian Polity and Economy, 1206-1757	2019	<ul style="list-style-type: none"> ➤ Students can familiarize in understanding the continuity with changes in all spheres of history, polity and economy under the Delhi sultanates. ➤ Students can understand thoroughly the Mughal conquest of India, their rule, polity and legacy.vv
3	HST 103	History of Modern India, 1757 –	2019	<ul style="list-style-type: none"> ➤ Student can gain knowledge on the English

		1947		East India company rule and their reforms.
4	HST 104	History of Modern World, 1900-1945	2019	<ul style="list-style-type: none"> ➤ Student can gain the knowledge on the history and consequences of the World between two World Wars pertaining to League of Nations, Great Depression, Nazism, and Fascism. ➤ Students will understand International Relations during 1919-39. ➤ Students can understand thoroughly about the Second World War and its impact.
5	HST 105 (A)	History of Andhrasupto 1336 A D	2019	<ul style="list-style-type: none"> ➤ The study of comprehensive history of the country is incomplete without the study of regional history. ➤ Regional history is becoming more and more popular, for it has inherit potential of tapping varied kinds of sources for understanding the divergent aspects of local heritage and culture. ➤ The students can develop thorough understanding on Ancient Andhra history and culture.
6.	HST 105 (B)	History of World Civilizations	2019	<ul style="list-style-type: none"> ➤ Students gain familiarity with the rise and characteristic features of the ancient world Civilizations, its regional extent and variation. ➤ Students can understand the glory of the civilizations, the nature of its cities and material remains and institutions.
	HST 106 (A)	Theoretical Concepts of Tourism	2019	<ul style="list-style-type: none"> ➤ Students gain familiarity with the rise and characteristic features of the ancient world Civilizations, its regional extent and variation. ➤ Students can understand the glory of the civilizations, the nature of its cities and material remains and institutions.
7.	HST 106 (B)	History of Medieval World	2019	<ul style="list-style-type: none"> ➤ Student can gain thorough knowledge on the world in medieval ages and rise of Christianity ➤ Will understand Transition to Modern Age ➤ Possess knowledge on French Revolution

				and its Impact
8.	HST 107	Human Values and Professional Ethics-I.	2019	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at large
9.	HST 201	History of India 650-1206 A D	2019	<ul style="list-style-type: none"> ➤ Students can develop comprehensive knowledge on political, social, economic, religious and cultural history of early medieval India , regional polities and its impact ➤ Can also able to understand the circumstances lead to the invasions of Arabs and foundation of Muslim rule in India
10	HST 202	Social and Cultural History of India, 1206-1757	2019	<ul style="list-style-type: none"> ➤ Students can gain comprehensive knowledge on the freedom movement from its inception upto independence in India ➤ The students can also able to understand the role of national congress and prominent leaders of national movement, problems and perspective in the progress of freedom movement
11	HST 203	Freedom Movement in India, 1857 –1947	2019	<ul style="list-style-type: none"> ➤ The students can understand the Cold War and its Impact ➤ Possess knowledge on UN and the Concept of World Peace ➤ Gain the knowledge on the Disintegration of Socialist Block
12	HST 204	History of Contemporary World, 1945-2000	2019	<ul style="list-style-type: none"> ➤ This course provides comprehensive knowledge on the last imperial political formation in South India and the history of Vijayanagara, Bahmani and contemporary pretty powers. ➤ It helps to understand with the context of polity, economy, culture, religious and ideological

				changes
13	HST 205	A) History of Vijayanagara Empire B) History of Modern Africa	2019	<ul style="list-style-type: none"> ➤ Students will be familiar with Road to Independence in Africa ➤ They will understand development and underdevelopment in Africa
14	HST 206	A) Historical Application of Tourism in India B) Women Studies in Modern India	2019	<ul style="list-style-type: none"> ➤ The students can familiarize the knowledge needed to excel in tourism activities. ➤ It will equip the students with the solid foundation to build upon the fundamentals, useful skills and expertise that can assist employment in Tourism Industry.
15	HST 207	Human Values and Professional Ethics-II	2019	<ul style="list-style-type: none"> ➤ The student can understand thoroughly the importance of Women Studies ➤ Will understand the role of Women in Hinduism and Islam ➤ Also gain knowledge about the Women participation in various movements in India

14. Human Rights and Social Development

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1.	HR 101	Human Rights: Concepts and Theoretical Perspectives	2019	<ol style="list-style-type: none"> 1. To Expose the students about nature and concept of Human Rights. 2. To apprise the students about the Liberal. Marxian perspectives. 3. To expose the students that alternative, third world and Indian Perspectives of Human Rights,
2.	HR 102	Human Rights in India the constitutional and Legal Framework	2019	<ol style="list-style-type: none"> 1. Students to know the Indian Constitution and Human Rights. 2. To understand the Judiciary and Human Rights. 3. To understand about Criminal Justice system in India.
3.	HR 103	Human Rights and Duties Education	2019	<ol style="list-style-type: none"> 1. To expose students about the importance of Human Rights and Duties education. 2. To apprise the students about the target groups for Human Rights <p>To expose the students about the content of Human Rights Education.</p>

4.	HR 104	Rights and the implementation Machinery	2019	<ol style="list-style-type: none"> 1. To expose the students about the implementation machineries at National Level and International Level. 2. The students understand about how the problems in Accessing Justice through Courts and Tribunals. 3. To expose the students that statutory bodies of Human Rights.
5.	HR 105 A	Working Class and Human Rights and Duties	2019	<ol style="list-style-type: none"> 1. To understand the students about the status of working class, concept and issues. 2. To expose the student about the basic rights and duties of various sections. 3. To understand the Indian Constitutional Framework.
6.	HR 105 B	Human Rights Education, Teaching and Training	2019	<ol style="list-style-type: none"> 1. To expose the student about the origin, UNO and Human Rights education policies. 2. To apprise the students about the principles and practice in teaching of Human Rights Education. 3. To understand the student about training aspects of Human Rights.
7.	HR 106 A	Human Rights Activism and Role of NGOs	2019	<ol style="list-style-type: none"> 1. To expose the students about the different types of Human Rights Activisms. 2. To identify the student that the different Types of NGO's and their role for promoting the Human Rights.
8.	HR 106 B	Social Movements and Human Rights in India	2019	<ol style="list-style-type: none"> 1. To expose the students about the role of

				<p>NGOs for protecting human rights.</p> <p>2. To Understand the student about the Political Movements, Ecological and Environmental Movements of Human Rights.</p> <p>3. To apprise the student about the various types of Social and Political Reforms of Human Rights.</p>
9.	HR 107	Human Values and Professional Ethics - I	2019	<p>1. To expose the student about the concept and nature of human values.</p> <p>2. To understand the student about nature of Values, Ahimsa and various religion theories.</p> <p>3. To assess the student about various Crime and Theories of punishments</p>
10	HR 201	Human Rights and Indian Polity	2019	<p>1. To expose the students about the concept of basic structure of Indian Polity, administrative structure in India.</p> <p>2. To apprise the student about the role of People's Agencies for protecting and promotion of human rights in India.</p> <p>3. To understand the students about the Legislative Procedure and implementation process in India.</p>
11	HR 202	Emerging Dimensions of Human Rights	2019	<p>1. To expose the students about the Human Rights and Duties of Non-State Armed Groups and Commercial Corporations.</p> <p>2. To understand the students about the rights</p>

				<p>of future generation.</p> <ol style="list-style-type: none"> 3. To apprise the students about the Human Rights and Changing Dimension of State Sovereignty and Humanitarian' Intervention.
12	HR 203	Human Rights: The International Context	2019	<ol style="list-style-type: none"> 1. To understand the students about the evolution of human rights and UN charter of human rights. 2. To expose the students about regional dimensions of human rights and special conventions on human rights. 3. To understand the students about International conventions on human rights and duties.
13	HR 204	Research Methodology, Statics and Computer Applications	2019	<ol style="list-style-type: none"> 1) Student to Know Scope of Social Research. 2) To Understand Data Analysis. 3) Understand About Types of Data Collections
14	HR 205 A	Human Rights – The Socio Economic Context	2019	<ol style="list-style-type: none"> 1. To expose the students about the socio, economic background of human rights. 2. To apprise the students about human rights of vulnerable groups. 3. To understand the students about the basic human need for development with respect to human rights.
15	HR 205 B	Societal Problems of Human Rights in	2019	<ol style="list-style-type: none"> 1. To understand the student about the societal

		India		<p>problems of human rights.</p> <ol style="list-style-type: none"> To understand the students about the social problems of minorities, scheduled caste and scheduled tribes. To expose the students about Regionalism, terrorism.
16	HR 206 A	Human Rights and Criminal Justice System	2019	<ol style="list-style-type: none"> To expose the students about Rights of Inmates of Prisons and Custodial Homes. To understand the students about the Right to Legal Aid, Access to Justice and Speedy Justice. To expose the students that the problems of human rights.
17	HR 207	Human Values and Professional Ethics - II	2019	<ol style="list-style-type: none"> To expose the student about the concept and nature of human values. To understand the student about nature of Values, Ahimsa and various religion theories. To assess the student about various Crime and Theories of punishments.
18	HR 301	Social Movements and Human Rights and Duties	2019	<ol style="list-style-type: none"> To expose the student about conceptual perspectives of social movements and human rights. To apprise the students about the social, political and religious reforms movements and human rights. To expose the students that the role of

				International and National Institutions in promoting Human Rights.
19	HR 302	Science, Technology, Human Rights and Duties	2019	<ol style="list-style-type: none"> 1. Understand the basic concept in science and technology and also about Indian perspective on science and technology. 2. Ability to know about the Right to Adequate Food, Agricultural, Biotechnology Impact of on Agriculture, Food Biotechnology and Revolution in Information Technology. 3. Analyse know rights to health and application of Biotechnology in Medicine and also about Intellectual Property Rights. 4. Assess the use of natural resource Environmental Biotechnology and Use Technologies
20	HR 303 A	Human Rights and Duties – Advocacy and Extension work and Viva-Voce	2019	<ol style="list-style-type: none"> 1. To understand the students that the issues for peoples movements and public advocacy on human rights and duties 2. To understand the students on extension work with respect to human rights. 3. To understand the students about the uses of NGOs fact finding and uses of information media.
21	HR 303 B	Socially/Economically Disadvantaged people and Human Rights and Duties	2019	<ol style="list-style-type: none"> 1. To expose the students about the concept of the

				<p>Constitutional Safeguards and Special Protection Laws and Policies.</p> <p>2. To understand the students about the concept of the disadvantaged people in the Indian Society.</p> <p>3. To understand the students about the Institutional Mechanisms for protecting the human rights of the disadvantaged groups.</p>
22	HR 303 C	Human Duties and Responsibilities	2019	<p>1. To understand the student about the concept of human duties and responsibilities.</p> <p>2. To expose the student about human values and values of humanism.</p> <p>3. To apprise the students about evaluation of human duties.</p>
23	HR 303 D	Children and Human Rights and Duties	2019	<p>1. To understand the student about the concepts of Child Labour and protecting norms at National and International level.</p> <p>2. To apprise the student that the status of children in Indian society with respect to human rights.</p> <p>3. To understand the students about the National and International mechanisms for protecting the child rights.</p>

24	HR 304	Soft Skills	2019	<ol style="list-style-type: none"> 1. To understand the student that the concepts of soft skills with respect to human rights. 2. To understand the student in employability skills in human rights aspects. 3. To expose the students that the professional skills for team building and problem solving.
25	HR 305 A	Historical and Philosophical Perspectives of Human Rights	2019	<ol style="list-style-type: none"> 1. To expose the student that the a basic understanding to the concepts of human rights, human values, dignity, justice and equality. 2. To understand the students that the theories of human rights in various inter disciplinary dimensions. 3. To apprise the student that the concept of Magna Carta-Bill of Right-French and American- Declaration and Uncharted on human rights.
26	HR 305 B	Human Rights and Duties in India	2019	<ol style="list-style-type: none"> 1. To understand the students about the concepts of Constitutional Human Rights and Responsibilities. 2. To apprise the students that Extra-ordinary situations and human rights in India. 3. To understand the violations of rights in present Civil Society in India.
27	HR 401	Human Rights in Andhra Pradesh	2019	<ol style="list-style-type: none"> 1. To expose the students about various Human Rights Movements at National and State

				<p>Andhra Pradesh) Level.</p> <ol style="list-style-type: none"> 2. To understand the concept of social stratification and problems of Caste and Un-touchability. 3. To expose the students that the gender inequality and various gender violation in Andhra Pradesh.
28	HR 402	Development, Trade and Human Rights	2019	<ol style="list-style-type: none"> 1. To understand the student about the concept of human rights of various vulnerable groups ath National and International level. 2. To apprise the student about the Trade related human rights violations and Trade development. 3. To understand the student about the role of human rights in development.
29	HR 403 A	International, Humanitarian and Refugee Laws	2019	<ol style="list-style-type: none"> 1. To expose the students about the concepts of International Humanitarian Law and Implementation enforcements of IHL. 2. To apprise the student about the concept of International Refugee Law and protection under International Law. 3. To understand the students about solution to Refugee Problem.
30	HR 403 B	Environment and Human Rights and Duties	2019	<ol style="list-style-type: none"> 1. To expose the student about the concept of Environment and rights to clean environment. 2. To apprise the students about the International regimes for protection.

				<ol style="list-style-type: none"> 3. To understand the students about the role of various agencies for protecting environment with respect to human rights.
31	HR 403 C	Human Rights and Criminal Justice System	2019	<ol style="list-style-type: none"> 1. To expose the student about the concept of the International Human Rights systems. 2. To understand the student about the International Organisations for protecting the Human Rights. 3. To understand the students about the UN Organs and Human Rights.
32	HR 403 D	Minorities and Human Rights and Duties	2019	<ol style="list-style-type: none"> 1. To student understand that the concept of evolutionary perspectives and Institutional mechanisms for protection of Minorities. 2. To expose the student that rights and duties of Minorities under in the Indian System. 3. To apprise the student that the Minorities and human rights challenges.
33	HR 405 A	Development, Globalization and Human Rights	2019	<ol style="list-style-type: none"> 1. Understand to role of Human Rights in Development and various theories of development. 2. Analyses the new international Economic Order (NIEO),WTO

				<p>GATT and International Trade and Human Rights Perspective in India.</p> <p>3. Evaluate the Globalisation and its impact on agriculture, environment, labour, women, culture and health.</p> <p>4. Know about the Transnational Corporations (TNCs) and Human Rights violations and Impact of GATT-WTO on sovereignty.</p>
34	HR 405 B	Women and Human Rights and Duties	2019	<p>1. To expose the students about the concept or the status of women in various sectors with respective human rights.</p> <p>2. To expose students about the National and International norms for protection at International and National level.</p> <p>3. To apprise the students about the Institutional mechanisms for Protection of rights of women.</p>

Human Rights and Duties

S.No	Programme Name	Programme Code	Course Name	Course Code	Year of Introduction	Course Outcomes
1	Human Rights and Duties	161	Human Values and Professional Ethics-I.	HR -106	2019	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at large.
2	HR -205	161	Human Values and Professional Ethics-II	HR -205	2019	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at large.

15. Law

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes

1	CO -101	Mass Media Law	2019	<ul style="list-style-type: none"> a. Have a detailed and sophisticated understanding of the general principles governing freedom of speech, the public interest and the media; b. Have a detailed, technical and specialised understanding of the constraints imposed on the media in the reporting of court proceedings; c. Have developed the ability to independently understand, research and critically analyse legal and scholarly developments that contribute to professional practice in the area of media law; and d. Have a detailed, technical and specialised understanding of defamation law in India and comparatively; e. Have developed expert knowledge of the practical operation of defamation law in India and comparatively;
2	CO-102	Public Utilities Law	2019	<ul style="list-style-type: none"> a. government policy in regard to such utilities in general and to each utility in particular, b. The growth and evolution of the public utilities; c. patters of the laws of incorporation and d. powers, functions and liabilities of the public utilities vis-a-vis their employees, consumers and others.
3	CO- 103	Law and Social Transformation in India	2019	<ul style="list-style-type: none"> a. Critically analyse the Law as an instrument of social change and product of tradition and culture b. Explore the nature and function of Law as an institution and process interlinked with the social and economical philosophy of education. c. Examine development of law from historical processes and how for the a touch of modernization and value can be added to legal system

				d. To analyse the different approaches of Law and Justice
4	CO - 104	Indian Constitutional Law: The New Challenges	2019	<ul style="list-style-type: none"> a. Understand and interpret Constitution to address the emerging complex issues; b. Explore the various functional theories, doctrine and Constitutional principles working in the backdrop and its interplay with the emerging issues; and c. Examine the boundaries, limitations, of Constitution from different perspectives and explore the possible approaches of interpretation and understanding from the perspective of Law and Justice.
5	CO - 201	Union – State Finance Relations	2019	<ul style="list-style-type: none"> a. To understand India as development of complex federal structure (Quasi) federal and its strength and weaknesses; b. Explore the various functional theories, doctrine and Constitutional principles of federalism and its interplay under Indian Constitution; and c. To examine the area of conflicting interest between Union and State and primacy of Union over the State.
6	CO - 202	Constitutionalism, Pluralism and Federalism	2019	<ul style="list-style-type: none"> a. To explore the basic principles of Constitutionalism, different model of federalism and its interplay in the Indian legal system; b. To examine the adoption of, utility and justification of Constitutional model in India; and c. To analyse India as pluralist society and suitability of various model, approaches in India in functional aspects of comparison with other legal system.
7	CO – 203	Judicial Process	2019	<ul style="list-style-type: none"> a. Intended to highlight the role of court as policy maker, participant in the power process and as an

				<p>instrument of social change.</p> <p>b. expose the intricacies of judicial creativity and the judicial tools and techniques employed in the process.</p> <p>c. Since the ultimate aim of any legal process or system is pursuit of justice, a systematic study of the concept of justice and its various theoretical foundations is required.</p> <p>d. Intends to familiarise the students with various theories, different aspects and alternative ways, of attaining justice.</p>
8	CO – 204	Legal Education and Research Methodology	2019	<p>a. Critically analyse the various research skill, especially in the field of law;</p> <p>b. To develop the skill of application of teaching methods in legal education</p> <p>c. To understand and analyse the various strength and weakness of teaching learning and research process for the field of law; and</p> <p>d. To develop the skill of utilising computer technology for Legal education and Legal research.</p>
9	CO – 301	Human Rights	2019	<p>a. Acknowledge the social and economic rights of workers, forced labour, child labour, bonded labour, slavery, trade union, social security, right to health, standard of living, protection of families etc.</p> <p>b. To gain and acquire the knowledge about cultural rights of indigenous population.</p> <p>c. Understand the third-generation solidarity right of various populations.</p> <p>d. Acknowledge the ideas and knowledge about</p>

				Human right Protection system of United Nations in the light of Covenant of Civil and Political rights.
10	CO – 302	National Security, Public Order and Rule of Law	2019	<ul style="list-style-type: none"> a. Understand and interpret various provision and safeguards to protection national security; b. To explore the various approach of public order, importance of rule of law and different legislations; c. Balancing the civil liberties and power of state; and d. Explore the various functional institution like election commission, parliament and check and balance on the national importance.
11	CO- 303	Practical Training	2019	<ul style="list-style-type: none"> a. Critically apply the understanding and application of legal research principles to legal research writing; b. To explore the various stages and its application for the practical record work; c. To have the development of idea, and its application; d. To have the ability to provide the original and non-plagiarised work to the existing field of knowledge e. Legal aid Camps and Legal Literacy Programmes, Court Observation work. f. On the completion of the course students will develop an inclination towards research and academics.
12	CO- 304a	Environment Protection and The Law	2019	<ul style="list-style-type: none"> a. Study the relationship between environment and climate change as well as the role of law, judiciary, resolution mechanisms but the alternate

				energy solutions and how people are dealing with climate changes, environmental laws and implementation of available solutions.
13	CO- 304b	Intellectual Property Rights Law	2019	<ul style="list-style-type: none"> a. To give philosophical underpinnings of traditional notion of property and IP • b. To examine the link between Industrial development & IP protection • To examine the conceptual development of IP concepts through judicial approach • c. To examine the impact of IP on economy, health and daily activities • d. To understand the basic principles enunciated in international agreements relating to IP
14	CO- 401	Dissertation and Viva-Voce	2019	<ul style="list-style-type: none"> a. Identify key research questions within the field of Demography on which you will carry out independent research. b. Manage your time effectively whilst working on your independent research. c. Demonstrate appropriate referencing and develop skills in other aspects of academic writing. d. Demonstrate knowledge and understanding of report writing. e. Apply the demographic/statistical research training acquired in the taught element of the programme by designing an appropriate research strategy and research methodology to carry out your research
15	CO – 402a	Law of Consumer Protection	2019	<ul style="list-style-type: none"> a. Define provision under the Consumer Protection and Right to Information Act and apply them to situations accordingly b. Draft a consumer complaint with ease c. Confidently approach a Consumer Forum and get

				<p>aware of the redressal mechanism</p> <p>d. To expose the students about Consumer Protection Laws;</p> <p>e. To develop the conceptual understanding of Consumer Protection regime.</p>
16	CO- 404 b	International Human Rights (MOOC / ONLINE COURSE)	2019	<p>a. Analyze and comment on key controversies surrounding the development of international human rights law</p> <p>b. Use conceptual tools to follow the developments of human rights law</p> <p>c. Be most effective in contributing to the enforcement of international human rights law</p>

16. Library and Information Science

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	LIS-101	Foundation of Library and Information Science	2019	<p>1. Know the various types of libraries and their role in the society</p> <p>2. Learn the Professional ethics and library Legislation in India</p> <p>3. Understand LIS education in India and various library associations in India</p>
2	LIS102	Knowledge Organization: Classification Theory	2019	<p>1.. Understand the definition, need and purpose of classification</p> <p>2. Learn the Fundamental Categories, Facet</p>

				<p>Analysis, types of Isolates in all schemes of classification</p> <p>3. Understand the Notation, trends and developments in Classification</p>
3	LIS-103P	Knowledge Organization:Classification Practice	2019	<p>1.Learn the Dewey Decimal Classification Scheme</p> <p>2. Get the skill regarding assigning the class numbers</p> <p>3.Have knowledge on Tables and Schedules of DDC</p>
4	LIS-104	Knowledge Management	2019	<p>1.Get an idea on the concepts of knowledge management, types of knowledge</p> <p>2.Understand the knowledge creation models, knowledge transfer in E-World</p> <p>3.know the tools for knowledge management and neural network and datamining</p>
5	LIS-105	Introduction to Information Technology	2019	<p>1.Gain knowledge on the concepts of computer basics and Network technologies</p> <p>2.Understand the concepts of Operating Systems, Programming Languages and types of softwares</p> <p>3.Learn the Database Management systems, steps in development of databases and get an idea on</p>

				different library software packages
6.	LIS-106	Human Values and Professional Ethics-I	2019	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
7.	LIS-201	Information Sources and Services	2019	<p>1.Learn documentary and non-documentary sources and different types of information sources</p> <p>2.Know about the Indian and British National Bibliographies, and Electronic Books</p> <p>3.Understand the virtual reference service and translation Services</p>
8.	LIS-202	Knowledge Organization: cataloguing Theory	2019	<p>1.Understand the basic ideas on catalogue, forms of the catalogue, Main Entry and added entries</p> <p>2. Know the Canons, Principles and Laws of Cataloguing</p> <p>3.Gain the knowledge on different types of</p>

				subject headings, Cooperative and Centralized cataloguing
9.	LIS-203P	Knowledge Organization: cataloguing Practice	2019	<p>1. Gain knowledge on Anglo American Cataloguing Rules</p> <p>2. Learn the preparation of Main entry and added entries for monographs and serial publications</p> <p>3. Gain the skills on preparation of entries on cartographic materials, manuscripts and sound recordings</p>
10.	LIS-204P	Meta data Standards- Practice	2019	<p>1. Know the Metadata and its types, standards</p> <p>2. Learn the skills on KOHA Software</p> <p>3. Learn the skills on MARC 21 and Dublincore</p>
11	LIS-205	Library Management	2019	<p>1. Gain knowledge on meaning and purpose of management, Organizational Structures</p> <p>2. Able to identify the factors behind selection, procurement and accessioning of documents</p> <p>3. Gain knowledge on a circulation system suitable for a library, different budgetary methods and its standards, norms and principles</p>
12	LIS-206	Human Values and Professional Ethics-II	2019	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today</p>

				<p>life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	LIS-301	Information Processing and Retrieval Theory	2019	<p>1.Understand the basic concepts on Information procession and Retrieval and various schemes on classification</p> <p>2.Learn the Indexing Systems and Techniques and their Evaluation Criteria and Studies</p> <p>3.Gain knowledge on Web based Information Retrieval Systems</p>
14	LIS-302	Library Automation and Digital Library	2019	<p>1.Learn the basics of Library Automation, various modules of library automation software packages and their features</p> <p>2.Gain knowledge on basic concepts and characteristics of digital libraries</p> <p>3.Know about network and communication devices, digitization and metadata</p>
15	LIS-303	Search and Search strategies	2019	<p>1.Gain knowledge on search strategies, various types of databases, internet searching tools</p> <p>2.Understand Z39.50 protocol and Wide area information servers</p> <p>3. 3.Learn the search engines and meta search engines.</p>
16	LIS-304B	Internship	2019	<p>1.Attain skills on all types of sections and its maintenance in libraries in which they underwent training</p> <p>2.Get skills on maintenance of Digital Library</p> <p>3.Learn the skills on preservation and</p>

				conservation of manuscripts and digitization.
17	LIS-304C	Academic Library System	2019	<p>1.Know the basic objectives, growth and development of Academic Libraries in India, UK and USA</p> <p>2.Learn about an overview of higher education in India, UGC, its powers and functions and its role in the development of academic libraries</p> <p>3.Understand the total design of the building, techniques of financial management, and know the organization of library and information services needed by distance learners and special users</p>
18	LIS-305A	Information Literacy (OE)	2019	<p>1.Learn the concepts of Information Literacy and sources of Print and Electronic Information</p> <p>2.Get the skills on information access through INFLIBNET Network</p> <p>3.Able to understand the Internet and its search techniques and Intellectual Property Right</p>
19	LIS-401	Research Methodology	2019	<p>1.Understand the definition, need and purpose of various research methods</p> <p>2.Get the knowledge on Research design, techniques and tools</p> <p>3.Gain the skills on Data analysis and Interpretation of Data in SPSS.</p>
20	LIS-402P	Software for Libraries-Practice	2019	<p>1.Attain knowledge on D Space, GreenstoneDigital Library Softwares</p> <p>2.Learn about Koha : Library Management Software, E-Resources, Directory of Open Access Journals,</p> <p>3.Get an idea on designing of Web Page and Data</p>

				Mining
21	LIS-403	Dissertation/Project Work	2019	<p>.</p> <ol style="list-style-type: none"> 1. Gain Knowledge on how to select the theme for their work 2. Learn the writing styles, preparation of questionnaire, data analysis and interpretation and Citation styles 3. Get the skills on findings and conclusion in dissertation
22	LIS-403A	Management of Information System	2019	<ol style="list-style-type: none"> 1. Know the basic concepts in Management, and various methods of decision-making and its application to Library and Information Centers 2. Understand the budgeting techniques and methods and policies and procedures 3. Gain knowledge on system analysis, PERT/CPM
23	LIS -404C	Information Processing and Retrieval: UDC and Indexing Practice	2019	<ol style="list-style-type: none"> 1. 1. Gain knowledge on Universal Decimal Classification 2. Learn different Indexing systems 3. Understand the design and development of thesaurus
24	LIS-405-B	Technical Writing	2019	<ol style="list-style-type: none"> 1. Know the definition and types of technical writing 2. Attain the idea on technical writing process and styles 3. Get the skills on technical writing techniques, use of MS-Office for preparation and presentation of technical writing

17. Mass Communication & Journalism

18. Performing Arts(Music)

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	162	MA Performing Arts(Music)	2019	PAM-105 (P) Compulsory Foundation in Music -1 Clear cut training of foundation in Carnatic Music
2	162	MA Performing Arts(Music)	2019	PA-M 204 (P) Vilambakala Kritis Training to Perform slow tempo songs which is difficult rather than fast tempo songs
3	162	MA Performing Arts(Music)	2019	PA-M 205 (p) Compulsory Foundation in Music -2 Clear cut advance level training of foundation in Carnatic Music
4	162	MA Performing Arts(Music)	2019	PA-M 302 Compositions in Rare ragas widening knowledge to perform rare ragas
5	162	MA Performing Arts(Music)	2019	PA-M 303 Concert Ability to plan and execute a successful Carnatic concert Ability to create self employment opportunity
6	162	MA Performing Arts(Music)	2019	PA-M 402 Ragam Tanam Pallavi Learn and inculcate the most creative part of Carnatic Music To help student to shape out the creative rendering style of the student
7	162	MA Performing Arts(Music)	2019	PA-M 403 Project work Introduce to the methodology of doing research in music and introducing to data collection, analysis etc and train up him to look into the facts based on evidences
8	162	MA Performing Arts(Music)	2019	PA-M 404A Manodharma Sangeetha To enrich the knowledge of innovative music To educate the student to sing raga alapana neraval and Kalpanaswara which are the crucial Sections of creative music.

9	162	MA Performing Arts(Music)	2019	PA-M 404C Compositions of Dance Repertoire Knowledge in application of music in other art fields like theatre, opera etc Knowledge to select and utilize ragas according to the theme and text.
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**19.
Philosophy**

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16.philosophy				
S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
35	101	Classical Indian Philosophy	2019	. 1The Student has applied the knowledge of classical Indian Philosophy. 2.The Student has analyzed the principles of classical Indian Philosophy
36	102	Epistemology Indian	2019	1. The Student has known the Indian Epistemology

				2. The Student has understood the Pramanas in Indian Philosophy
37	103	Logic Indian and Western	2019	1. The Student has known the Indian Epistemology 2. The Student has understood the Pramanas in Indian Philosophy
38	104	Western Philosophy- Greek and Medieval	2019	1.The Student has known the important issues of Western Philosophy 2. The Student has understood the Principles of greeck and medieval Philosophy
39	105-A	Problems in Metaphysics	2019	1. The Student has known the Problems of Metaphysics 2. The Student has understood the Principles of Metaphysics
40	202	Ethics- Indian	2019	1. The Student has known the Ethics in Indian Philosophy 2. The Student has understood the various Ethical Principles in Indian Ethics.
41	203	Ethics –Western	2019	1. The Student has known the Ethics in Western Philosophy 2. The Student has understood the Ethical theories of Western Philosophy
42	204	Modern Western Philosophy	2019	1. The Student has known the Problems of Modern Western Philosophy

				2. The Student has understood the thoughts of Modern Western Philosophers.
43	205-A	Philosophy of Education	2019	1. The Student has known the Contents of Philosophy of Education. 2. The Student has understood the Educational aspects of Philosophy of Educatio
44	207	Audit course (HVPE)	2019	1. The Student has known the essence contents of human values. 2. The Student has understood the Professional Ethics..
45	301	Social and Political Philosophy	2019	1. The Student has known the contents of social Philosophy. 2. The Student has understood the Principles of Political Philosophy.
46	302	Philosophy of Vedanta	2019	1 . The Student has known the Philosophy of Vedanta. 2. The Student has understood the Philosophical Doctrines of Vedantas
47	303-A	Philosophical Approach to Gandhi	2019	1. The Student has known the metaphysical issues of Gandhi. 2. The Student has understood the Gandhian Philosophy
48	303-B	Philosophy of B.R.Ambedkar	2019	1. The Student has analyzed the Philosophy of Ambedkar.. 2. The Student has applied the Philosophical aspects of Ambedkar.
49	305-A	Philosophy of Value Education	2019	1.The Student has known the importance of Education... 2. The Student has understood the Philosophical values for life.

50	305-B	Sri Venkateswara Studies	2019	
51	401	Phenomenology and Existentialism	2019	<p>1. The Student has analyzed the contents of Phenomenology..</p> <p>2. The Student has applied the Philosophical Principles of Existentialism</p>
52	402	Comparative Religion	2019	<p>a.The Student has analyzed the aspects of Comparative Religion..</p> <p>b. The Student has applied the Philosophical Principles of different Religions</p>
53	403-A	Philosophy of Jiddu Krishnamurti	2019	<p>1.The Student has known the Philosophy of Jiddu Krishnamurti...</p> <p>2. The Student has understood the Philosophical insights and of jiddu Krishnamurti</p>
54	403-B	Analytical Philosophy	2019	<p>1. The Student has known the contents of Analytical Philosophy.</p> <p>2. The Student has understood the Philosophy of Philosophers of Analytical Philosophy..</p>
55	403-C	Sri Vaishnavism	2019	<p>1.The Student has analyzed the aspects of SriVaishnavism..</p> <p>2. The Student has applied the Philosophical Principles of .SriVaishvaism</p>
56	403-D	Research Methodology and Computer Applications	2019	<p>1.The Student has analyzed the principles of Research Methodology..</p> <p>2. The Student has applied the computer operating and applying principles</p>
57	404	Philosophy of Peace	2019	

58	405-A	Philosophy of Yoga	2019	1.The Student has analyzed the principles of Research Methodology.. 2. The Student has applied the computer operating and applying principles
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20. Physical Education

S.No	Name of the Course	Course Code	Year of introduction	Course Outcomes
1	B.P.Ed	Bachelor of Physical Education	2014-15	100%
2	Ph.D	Ph.D	2008	100%

21. Political Science & Public Administration

22. Population Studies

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	PS- 101	Population Characteristics and Theories	2019	<ul style="list-style-type: none"> i. Identify basic demographic concepts and definitions in Population studies ii. Impart knowledge on Population trends in size and growth of population at regional, national and global level. iii. Discover the implications of different theories on past and present population components with special reference to Malthusian theory
2.	PS - 102	Fertility	2019	<ul style="list-style-type: none"> i. Examine the basic concepts and measurements of fertility ii. Assess, compare and contrast trends in fertility and its determinants

				iii. Familiarize the concepts of nuptiality and factors affecting nuptiality
3.	PS – 103	Mortality	2019	<ul style="list-style-type: none"> i. identify the various concepts and measures of mortality ii. Examine the global levels and trends in mortality and its determinants iii. Acquire knowledge on techniques of life tables, constructions of multiple-decrement life table and computational aspects for demographical analysis
4.	PS 104	Sources, Evaluation and Adjustment of Data	2019	<ul style="list-style-type: none"> i. Examine and compare merits and demerits of various sources of population data ii. Understand the evaluation of data, factors affecting completeness of data iii. Reproduce knowledge on population projections, calculations and applications
5.	PS – 105	Population Education and Extension	2019	<ul style="list-style-type: none"> i. Examine the components of population education and create awareness on population education among the students and youth ii. Acquire skills to organize Extension Programmes in population education at school, college and Non formal educational levels iii. demonstrate training on population education methods and techniques in order to create awareness on population education
6.	PS - 106	Human Values and Professional Ethics-I	2019	<ul style="list-style-type: none"> i. Identify the concepts of ethics and its relation to religion, politics and environment ii. Memorize the different aspect of values and interpret the best skills in understanding the merits of value related aspects iii. Demonstrate to interpret crime and theories of punishment with special reference to acquire knowledge on Manu and Yajnavalkya

7.	PS – 201	Migration and Multi Regional Demography	2019	<ul style="list-style-type: none"> i. Explore the different types and trends in migration ii. Apply skills in measurement, causes and consequences of different migrations in different regions iii. Explore the theories and recommend suitable policies of migration
8.	PS – 202	N.G.O Management & Field Work Orientation	2019	<ul style="list-style-type: none"> i. Understand the role, importance and establishing of NGO ii. Explore the sources of funding of NGO's at national and international level iii. Explore demographic data by working with individuals, groups and communities
9.	PS - 203	Statistical Methods	2019	<ul style="list-style-type: none"> i. Familiarize the basic statistical methods and its applications to demographic data ii. Demonstrate knowledge on methods and techniques of sampling iii. Acquire skills in processing of data with computer
10.	PS - 204	Population Sociology	2019	<ul style="list-style-type: none"> i. Examine the basic sociological concepts, and evaluate the relationship of sociology to other social sciences ii. Identify the social institutions, social change and socialization iii. Explore the sociological theories of fertility and its application in contemporary society
11.	PS - 205	Fundamentals of Social Work	2019	<ul style="list-style-type: none"> i. Memorize the basic concepts of social work and its nature and scope. ii. Recognize the different methods of social work iii. Explore the social work practice in different fields iv. Acquire knowledge on the evolution of social work in India v. Explore the professional associations and

				importance of networking in social work profession
12.	PS – 206	Human Values and Professional Ethics - II	2019	<ul style="list-style-type: none"> i. Acquire and gain knowledge on different concepts of human values and behavioural changes. ii. Recognizing the medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics of medical and health care professionals. iii. Acquire skills on environmental ethics and its relation to Health
13.	PS - 301	Population Geography	2019	<ul style="list-style-type: none"> i. Enumerate the geographical factors affecting the distribution of population ii. Awareness and understanding of trends in urbanization and its impact on ecological imbalance, global warming, greenhouse effects. iii. Able to assess changing pattern of land use, conservation of resources and critical thinking of policies, programmes for better management of environment
14.	PS - 302	Research Methodology	2019	<ul style="list-style-type: none"> i. Demonstrate in conducting population research and surveys ii. Prepare research design and apply sampling techniques iii. Discover skills in methods and tools of data collection, data analysis, interpretation, and report writing.
15.	PS - 303	Community Health	2019	<ul style="list-style-type: none"> i. Discover comprehensive knowledge on concepts of community health, illness, disease prevention ii. Critical thinking on epidemiology, communicable diseases and its prevention iii. Understand and appreciate the concepts of health, nutrition, balance diet, nutrition deficiency diseases and National Health Programmes

16.	PS – 304 a	Population Psychology	2019	<ul style="list-style-type: none"> i. Appreciate the scope of psychology and the relationship between value of children and fertility ii. Familiarize and comprehend the significant psychological theories relevant to fertility and contraceptive behavior iii. Demonstrate leadership and effective communication skills in promoting health and family planning
17.	PS – 304 b	Population Policies and Programmes	2019	<ul style="list-style-type: none"> i. Explore population policies related to fertility, mortality and migration ii. Acquire the knowledge on methods of family planning and acts relating to medical termination of pregnancy, age at marriage and also registration of vital events iii. Apply best practices and strategies for promoting family welfare programme.
18.	PS – 304 c	Gerontology	2019	<ul style="list-style-type: none"> i. Understand the scope of gerontology and demographic dimensions of the elderly ii. Critically explore and analyze changes in status of elderly health, problems and needs of elderly iii. Acquire skills in dealing elderly issues like neglect, abuse, violence and abandonment caregivers stress and elderly neglect
19.	PS – 304 d	Population and Sustainable Development	2019	<ul style="list-style-type: none"> i. Examine the concepts and theoretical issues relating to sustainable development and sustainable goals ii. Assess and measure the quality of life, resource creation, and management and distribution iii. Critically think of the relationship between population, environment, poverty and population sustainable growth

20.	PS-305 a	Principles of Population Studies	2019	<ul style="list-style-type: none"> i. Explore the components of population change, trends in size and growth of population ii. Discover the concepts of fertility, mortality and migration iii. Acquire skills in exploring the sources and quality of data on fertility, mortality and migration
21.	PS – 305 b	Population, Society and Environment	2019	<ul style="list-style-type: none"> i. Understand the components of population change and sociological consequences ii. Demonstrate sociological perspective to analyze the relationship between man, ecology and environment iii. Critical thinking of Sustainable development and its concepts
22.	PS - 401	Communication for Family Welfare Programmes	2019	<ul style="list-style-type: none"> i. Examine the elements in communication process ii. Understand and apply different approaches to communication iii. Critically analyze and apply factors influencing a various communication methods to promote family planning
23.	PS – 402	Reproduce Health and Adolescent Issues	2019	<ul style="list-style-type: none"> i. Examine the anatomy and physiology of human reproduction, conception and pregnancy ii. Describe the male and female reproductive health problems iii. Assess and examine various adolescent issues
24.	PS - 403	Population Growth and Development	2019	<ul style="list-style-type: none"> i. Understand the indicators of development with special reference to population growth and development. ii. Discover the concepts of economic inequality and its causes iii. Examine the status of women and development and demographic consequence of women empowerment

25.	PS – 404 a	Dissertation	2019	<ul style="list-style-type: none"> i. Develop in-depth knowledge of field work and community surveys ii. Acquire the skills to present and discuss the findings through seminars iii. Explore the skills in preparation and presentation of research findings
26.	PS – 404 b	Demography of Andhra Pradesh	2019	<ul style="list-style-type: none"> i. Acquire knowledge on basic trends and changes in population growth in Andhra Pradesh ii. Examine the migration and urbanization, problems of slums and related policies with special reference to Andhra Pradesh iii. Explore the population policies and programmes in Andhra Pradesh
27.	PS – 404 c	Social Work in Industry and Human resource Management	2019	<ul style="list-style-type: none"> i. Understand the concepts, principles and functions of Management ii. Acquire skills on difference process of Human Resource management iii. Demonstrate the organizational behavior, management conflicts and organization of interventions iv. Concepts of Industrial relations and related legislations for industrial workers
28.	PS – 404 d	Health Economics	2019	<ul style="list-style-type: none"> i. Explore the concepts in economics in relation to health and population dynamics ii. Acquire skills in assessing costing and health economics iii. Critically analyze and evaluate general health status and quality of life and also measurement of health outcomes
29.	PS – 405 a	Rural, Urban, Tribal Development	2019	<ul style="list-style-type: none"> i. Explore the characteristics of rural, urban and tribal community ii. Discover community development and

				<p>experiment projects in rural, urban and tribal areas</p> <p>iii. Critically examine and understand the issues related to rural, urban and tribal areas and approaches to community development</p>
30.	PS – 405 b	Social policies and planning	2019	<p>i. Discover social policies in relation to Indian constitution.</p> <p>ii. Examine the approaches to social policy</p> <p>iii. Demonstrate and analyze various social policies and their implementation</p>

Masters in Social Work

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	MSW- 101	Sociology for Social Work	2019	<p>i. Discover basic concepts in Sociology and examine the relation between individual and society.</p> <p>ii. Distinguish between Socialization, Social institutions and Social groups</p> <p>iii. Critically demonstrate , Social Stratification, Social Deviance, Social Change and Social Problems</p>
2.	MSW - 102	Human Growth and Personality Development	2019	<p>i. Memorize various stages of Human Growth and Development</p> <p>ii. Identify different concepts of Human Behavior like Motivation, Perception, Learning and</p>

				<p>Attitudes</p> <p>iii. Discover experience in assisting the person in Solving their Psycho social problems through personality development and adjustment</p>
3.	MSW – 103	Social Work Profession & Field Work Orientation	2019	<p>i. Recall various concepts like Social Service, Social Welfare, Social Development and Social Work</p> <p>ii. Experiment on Ethical Values of Professional Social Work and analyze current trends in Social Work</p> <p>iii. Design field work in Social Work and acquire skills to involve the client in problem solving process</p>
4.	MSW 104	Social Work Practice with Individuals & Groups	2019	<p>i. Recognize the basics Concepts , Techniques and Skills of case work</p> <p>ii. Apply different approaches of Case Work, Group Work</p> <p>iii. Evaluate the application of Social Case Work and Group Work at various settings like Schools, Hospitals, and Correctional Settings and in Communities.</p>
5.	MSW – 105	Social Work Practicum - I	2019	<p>i. Recognize the significance of Social Work in various settings</p>

				<ul style="list-style-type: none"> ii. Illustrate the application of Social Work Methods in the agencies during their field practicum iii. Examine the applications of Social Work Principles and Skills in the functions of different organizational systems
6.	MSW - 106	Human Values and Professional Ethics-I	2019	<ul style="list-style-type: none"> i. Familiarize the concepts of ethics and its relation to Religion, Politics and Environment etc. ii. Able to gain knowledge on different aspect of Values and Interpret the best Skills in understanding the merits of value related aspects iii. Discover to interpret Crime and Theories of Punishment with special reference to Manu and Yajnavalkya
7.	MSW – 201	Social Work Profession & Field work Orientation	2019	<ul style="list-style-type: none"> i. Recognize the Scope, Importance and Significance of Social Work Practice in different fields ii. Acquire Knowledge and Skills Essentials for Working with Groups and Communities iii. Formulate Capacity Building by organizing training and awareness programmes in the Field Work Settings
8.	MSW – 202	Social Work Practice with Communities	2019	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in

				<p>Community organization and Social Work practice</p> <p>ii. Appraise various approaches in Community Organization and Current issues in Community Organisation</p> <p>iii. Organize community participation using PRA methods and techniques</p>
9.	MSW - 203	Social Action and Social Legislation for Social Work Practice	2019	<p>i. Distinguish the elements of Social action, Models and Process of Social Action</p> <p>ii. Connect the Social Legislations with Social Work Practice</p> <p>iii. Appraise Laws pertaining to Women, children and Aged in Social work practice</p>
10.	MSW - 204	Social Policy and Planning	2019	<p>i. Examine the nature and Approaches of Social Policy in the Socio-economic and political context</p> <p>ii. Assess the implementation of Social Welfare Policies in Education, Health, Women, Children and Environment</p> <p>iii. Examine the Role of Social Workers in Formulating , Planning and Implementation of Social Policies</p>
11.	MSW - 205	Social Work Practicum-II	2019	<p>i. Examine the Nature, Scope and Functions of the different Government and non-profit organizations</p>

				<p>agency at ground level</p> <p>ii. Trained to assist their supervisor with in the limitations of the agency</p> <p>iii. Equipped with Professional Skills and Techniques through practical exposure</p>
12.	MSW – 206	Human Values and Professional Ethics - II	2019	<p>i. Summarize different concepts of Human Values and Behavioural changes required for adjustment in Family and Society</p> <p>ii. Demonstrates Medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics in Medical and Health care professionals.</p> <p>iii. Acquire Skills on Environmental ethics and the Environment and Health</p>
13.	MSW - 301	Social Work Intervention with Families	2019	<p>i. Discover the Family Centered Practice as a Model of Social Work practice and understand Family life management and Family Dynamics</p> <p>ii. Demonstrate Family Assessment and Application of Tools : Interviewing , Ecological assessment – Eco map , Generation assessment- Genogram, Triangle, Family Sculpture and Family Mapping</p>

				<ul style="list-style-type: none"> iii. Integrate social work practice with Families and Social Work Therapeutic Interventions wherever appropriate
14.	MSW - 302	Social Work in the Field of Health	2019	<ul style="list-style-type: none"> i. Examine the concept of Health, factors affecting health and Indicators of Health. ii. Evaluate Primary and Community healthcare services with special references to communicable and Non-communicable diseases iii. Assess the relevance, domains and nature of Social Work Intervention in different Health settings.
15.	MSW - 303	Counseling in Social Work Practice	2019	<ul style="list-style-type: none"> i. Understanding the basics of Counseling and Approaches of Counseling ii. Develop ability to apply appropriate Counseling Techniques with Special Group iii. Demonstrate to apply Counselling Skills while working with clients in various settings like Health ,Family and School Settings
16.	MSW – 304 a	Social work Research	2019	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in Social Work Research process and Statistics ii. Illustrate single subject and evaluation Research Designs along with various Research designs iii. Facilitate methods of Sampling, Data Collection,

				Analysis, Statistical-Applications and Report Writing
17.	MSW – 304 b	Gerontological Social Work	2019	<ul style="list-style-type: none"> i. Identify the Scope of Social Work in the field of Gerontology. ii. Illustrate Changes in the status of Elderly, Health problems and needs of Elderly. iii. Experiment the social work interventional strategies to Elderly ,Care givers and Counseling
18.	MSW – 304 c	Social Work Practicum-III	2019	<ul style="list-style-type: none"> i. Analysis the role of Community and dramatize the Community Organisation in field work practice ii. Develop skills and expertise their Field Work exposure to organize community programmes iii. Examine the new Intervention programs in the area of their specialization to bring a solutions to the problems in different community
19.	MSW – 304 d	Human Rights and Social Legislation	2019	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in Human rights ii. Distinguish various Social Legislations and Legislations related to Women and Children iii. Nurture the Social Work Professionals by creating awareness on various current issues and related Legislations

20.	MSW-305 a	Principles of Population Studies	2019	<ul style="list-style-type: none"> i. Demonstrate the concept of Population Studies, Components of Population Change Population Structure ii. Interpret basic concepts and measures of Fertility, Mortality ,Mobility and Migration iii. Critically evaluate the Concept of Multi Regional Demography, its uses and limitations
21.	MSW – 305 b	Fundamentals of Social Work	2019	<ul style="list-style-type: none"> i. Examine basic concepts, Principles and Methods of Social Work ii. Defend values and Principles of Professional Social Work and Code of ethics for Social Workers iii. Evaluate Social Work Education in India, Professional Associations, Problems of Professionalization and Networks in Social Work
22.	MSW - 401	Social Work Intervention with Children	2019	<ul style="list-style-type: none"> i. Examine the Significance and Development of Child Welfare Services with special reference to Child Rights ii. Appraise various Institutional and Non-Institutional services for children in need iii. Create Professional Knowledge on Social Work Intervention with children in difficult situations

23.	MSW – 402	Rural/Urban/Tribal Development & Empowerment –I	2019	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in rural Urban and Tribal community and Community Development Projects across the country ii. Trained to meet the challenges specifically related to Rural, Urban and Tribal communities iii. Will nurture the Social Work Professionals to become effective Social Worker and contribute to community by conducting awareness camps, strengthening Self-Help Groups and Facilitating Empowerment in the communities.
24.	MSW - 403	Social Work in the Field of Mental Health	2019	<ul style="list-style-type: none"> i. Understand the concept and importance of Mental Health and Psychiatric Social Work ii. Distinguish Psychiatric disorders and application of Therapeutic Interventions in Psychiatric Illness iii. Plan to provide Psychiatric Rehabilitation to assist Mentally Ill patients
25.	MSW – 404 a	Social Work in Industry & Human Resource Management	2019	<ul style="list-style-type: none"> i. Enrich knowledge on HRM, Personnel management, HR planning and ii. management systems iii. Appraise organizational behavior, conflict Resolution Strategies and Legislation related to

				<p>industrial relations</p> <p>iv. Develop skills in Industrial Social Work Practice and the role and significance of Corporate Social Responsibility</p>
26.	MSW – 404 b	Social Work Practicum-IV	2019	<p>i. Acquires training in the organization as social worker and develop sound knowledge on social work which will motivate them to start an NGO</p> <p>ii. Evaluate projects and organize programmes for fund raising</p> <p>iii. Hypothesize research in their area of specialization through which they can suggest recommendations to agencies for improving quality</p>
27.	MSW – 404 c	Social Work Practicum-V	2019	<p>Learn Skills and able to apply Principles during the Internship in Block Placement</p> <p>Explore research studies at Micro levels and submit reports as Mini Project Work</p> <p>Demonstrate as effective Social Worker in the agency in which they are placed</p>
28.	MSW – 404 d	Social Work and Disaster Management	2019	<p>i. Summarize and understand the disasters and Disaster Management</p> <p>ii. Acquire a critical perspective of the policy framework, Institutional Structures</p>

				and programmes for Disaster Management in India iii. Explore Mental health consequences and able to provide Psychosocial care in Disaster Management
29.	MSW – 404 a	NGO Management	2019	i. Distinguish the Concept, Structure, Registration and By laws of NGOs ii. Demonstrate Organisational Management and source of funding of NGOs iii. Familiarize to organize Human Resource Management in NGOs
30.	MSW – 404 B	Health Education	2019	Discover the Roles, Responsibilities, Approaches and ethics in Health Education Describe the Behavioral, Environmental, and Genetic risk factors for Communicable and Non- communicable diseases. Evaluate channels of Health education and organizational health set up at Central, State and District levels

23. Sanskrit

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SNSKT 101	Elements of Darsanas-I	2019	An understanding of the evolution of Darsanas I.To create an awareness of the Darsanas ii.Acquire Knowledge of the Baudda and Jaina Darsanas

				iii.To get the Knowledge of Meemamsa Sastra
2	SNSKT-102	Vedic Texts-I	2019	I.Students able to get the Vedic knowledge II.Students know the importance of Vedic gods III.Students are understanding the Vedic chandas IV.To make understanding the spiritual knowledge through Kathopanishat
3	SNSKT-103	PROSE AND POETRY-1	2019	I.An understanding of evolution of Sanskrit poetry across the ages until the modern age II.Get the knowledge of gadya kavya III.Understand the poetical skills IV.Understand the importance of kiratarjuneeya in Sanskrit literature
4	SNSKT-104	DRAMA, ALANKARA AND PROSODY -1	2019	Student will be able to get I.Understanding the features of Sanskrit drama II.Knowledge of organ and development of Sanskrit dramas III.Understanding the efficiency of kalida's poetic skill. IV.Get the knowledge of chandas V.Get the knowledge of different types of chandas
5	SANSKTI05 (A)	HISTORY OF SANSKRIT LITERATURE – 1	2019	After completed of course the students are able to I.Know the origin and development of Sanskrit literature II.Know the importance of Vedas and its date. III.Know the meaning and contest of Brahmanas, Aranyakas and Upanishads IV.Know the social conditions as reflected in the Brahmanas V.Know the importance of Ramayana and its date
6.	SANSKT :105(B)	DRAMA AND POETRY -1	2019	I.Students will be able to gain understanding the features of Drama, Sentiment Moralities II.Through understanding the importance and place of Rasa in the Drama III.The knowledge about the skillfulness of Bhavabhutis Dramatergy IV.Recognize the transpiration of human experiences into dramatic experiences V.The knowledge about importance of Sandesa Kavyas in Sanskrit

				Literature
7.	SANKT :105(C)	ALANKARA AND PROSODY - 1	2019	I.Students will understand the different types of Alankara II.Know the importance of Alankara in the poetry III.Understand the development of on the basis of similar IV.Recognize the Guru and Laghu in prosody V.Know the importance of melody through prosody
8.	SANSKT:106(A)	COMPARATIVE PHILOLOGY AND SIDDHANTA KOUMUDI- 1	2019	After complication of the course students are able to- I.Find out the main causes of semantic change II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing skills without grammatical mistakes..
9.	SANSKT:106 (B)	KAVYALANKARA SUTRA VRITTI -I	2019	I.Know the definition of poetry and prose II.Know the different types of Kavya III.Understand the different types of Riti IV.Understand the Pada and Padartha Doshas.
10.	SANSKT:107	HUMAN VALUES AND PROFESSIONAL ETHICS -I	2019	After completion of the course students are able to I.Understand Bhagavad Gita as a guide for modern life style II.Know the principles of Buddhism and Jainism III.Realize the necessary of practicing Human values and ethics in walks of life IV.Acquire the knowledge of Good and Bad V.Know the about crime and punishment according manu and Yajnavalkya
11	SANSKT – 201	ELEMENTS OF DARSANAS –II	2019	After completion of the course students are able to – I.Understand the knowledge of upamana and sabda pramanas II.Get the knowledge of Ayatharthanu Bhava III.Understand the Bahavana IV.Understand the Principals of Sankhya
12	SANSKT – 202	VEDIC TEXTS –II	2019	Students will know- I.The importance of Suktas

				II.The definition and purpose of Nirukta III.The meaning of Vedic words
13	SANSKT – 203	PROSE AND POETRY - II	2019	Students will able to get I.The beautification of prose literature. II.Enhancement of knowledge in appreciation of classical poetry III.Understanding about text that are selected. IV.Teaching skills in prose and poetry.
14	SANSKT – 204	DRAMA ALANKARA AND PROSODY – II	2019	Students will know I.The different characteristic features in Dramas II.The importance of nature and hermitages III.The features of Alankara and Classification of Alankaras IV.The knowledge of prosody
15	SANSKT – 205 (A)	HISTORY OF SANSKRIT LITERATURE –II	2019	After the completion of the course students are able to I.Know the features of Mahakavyas II.Know the structure of Drama and social message III.Know the moral values through the tales IV.Get the glance of classical Sanskrit literature
16	SANSKT – 205 (B)	DRAMA AND POETRY - II	2019	I.Get knowledge of good II.Know the character of Hero and Hero in etc., in the Drama III.Know the changes stories between original and creativeness IV.Know the importance skill fullness in poetry of Kalaidasa
17	SANSKT – 205 (C)	ALANKARA AND PROSODY - II	2019	I.Know the features and Examples II.Understand the different types of Uktis in Alankaras III.Know the difference between stuti and Ninda Alankaras IV.Get knowledge of sikharini and Mandakranta vrittas V.Know the definition and importance of Gayatri Matras
18	SANSKT - 206 (A)	COMPARATIVE PHILOLOGY	2019	After complication of the course students are able to – I.Find out the main causes of semantic change

		AND SIDDHANTA KAUMUDI – II		II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing Skills without grammatical mistakes
19	5 (B)	KAVYALANKARA SUTRA VRITTI - II	2019	I.Know the difference between Guna and Alankara II.Ability to understand the theory of Riti III.To enable to understand the usage of Sabdalankaras IV.Know the contribution of Vamana to alankara sastra
20	SANSKT - 207	HUMAN VALUES AND PROFESSIONAL ETHICS - II	2019	I.Understand the relevance of value based education in modern society II.Understand the old traditions of medical ethics III.Understand the solutions of illegal and unethical practice IV.Understand the man and nature, Natural calamities and get the solution regarding those situations.
21	SANSKT :301	(Sahitya) RASAGANGADHARA, (ANANA.I) – I (IE)	2019	After the completion of the course students are able to I. Understand the Rasaswarupa II.Understand the purpose of Kavya and different types of Kavya III.Know the interpretations of Rasa sutras and ten types of Gunas IV.Know the Abhasas
22	SANSKT :302	DHVANYALOKA - 1	2019	on completion of the course students are able to I.Understand the Dhvani swarupam II.Understand the opinion of Dhvanyabhavavadins III.Know the Dhavanikavya Lakshana IV.Know the Vyangya as Kavyatma V.Get the knowledge of splendid sastra Dhvanyaloka
23	SANSKT :303-A	KAVYAPRAKASA AND DASARUPAKA- 1(IE)	2019	Students will get - I.The knowledge of definition of kavya, types of kavyas II.The Knowledge about verities of vyangya III.The Knowledge of vyanjanaswarupa IV.An idea of ten types of Rupakas
24	SANSKT:30 3-B	HISTORY OF SANSKRIT POETICS	2019	On completion of the course students are able to I. Get the knowledge of sentence

		AND SANSKRIT ESSAY-I		formation to write the essays on different issues II. Acquire the knowledge of Alankarikas III. Understand the different theories in Alankara sastra. IV. Understand the theory of Alankara and Rithi.
25	SANSKT:30 3-C	Natyasastram Chapter I & VI only	2019	
26	SANSKT:30 3-D	Bhojaraja's Champu Ramayana (Balakanda only)	2019	
27	SANSKT:30 4	Personality Development in Pancatantra (Mitrabheda and Mitrapraptikam only)	2019	.I. Know the losses arriving out of Non friend ship II. Know the world knowledge III. Achieving personality development through Panchatantra
28	SANSKT:30 5-A	Introduction of Sanskrit language Infant Reader complete	2019	
29	SANSKT:30 5-B	Raghuvamsam (Ist canto only)	2019	on completion of the course students are able to I. Understand the greatness of Sanskrit Language II. Know the greatness of poetry III. Get knowledge on panchamahakavya's after the epic literature IV. Get the knowledge about the kalidasas Natural and beautiful creations V. Understand the uses of upamalankara by kalidasa
30	SANSKT:40 1	(SAHITYA) RASAGANGADHARA (ANANA-I)	2019	After completion of the course students are able to I. Know the number of Rasas in kavyas II. Know the uses of Rasa to elevate the situations in kavya III. Acquire the knowledge of Gunas and their role in Kavyas IV. Understand the differentiation of Bhava in Alankara sastra.

31	SANSKT :402	DHVANYALOKA –II	2019	Students will be able to get- I.The knowledge about different forms of schools II.Knowledge about the classification of Dhvani Siddhanta III.Knowledge regarding different alankara dhvanis IV.Know the difference between Rasadhvani and Rasavadalankara V.Know the main Rasa in Ramayana and Mahabharatha
32	SANSKT:40 3(A)	KAVYAPRAKASA AND DASARUPAKA– II	2019	After the completion of the course students are able to – I.Understand the structure of the Kavya II.Get the knowledge of Rasa and it's Bhedas III.Find out the classification of Dhvani IV.Understand the Lakshana of Nataka V.Get the knowledge about 10 types of Nataka Bhedas
33	SANSKT:40 3(B)	HISTORY OF SANSKRIT POETICS AND SANSKRIT ESSAY-II	2019	After the completion of the course students are able to – I.Get the knowledge of writing skills II.Acquire the knowledge of several Aesthetic poets like Mammata, Ruyyaka III.Understand the main theories on kavya of different poets IV.Get the knowledge of presentation skills on social related issues
34	SANSKT :403(C)	Kavyadarsa Chapter – I	2019	
35.	SANSKT :403(D)	KavyaMeemamsa first to Eight Adhyayas	2019	
36.	SANSKT :404	Introduction to Epigraphy and Manuscriptology	2019	After the completion of the course students are able to I.Get the knowledge of inscriptions II.Acquire the knowledge of Brahmi and kharoshthi scripts III.Get the knowledge of writing materials in Ancient India IV.Get the knowledge of edition and critical edition of Manuscripts
37.	SANSKT :405 (A)	Hithopadesa of Narayanapandita	2019	Students will be able to I.Get the moral values

		Mitralabha and Mitrabheda		II. Understand the mentality of different kinds of people in the society III. Acquire the knowledge to behave a good citizen and a well human being IV. Understand the message through neetikavya
38.	SANSKT :405(B)	Kautilya's Arthasastra Chapter – I (Vinayadhikarikam)	2019	

24. Sociology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MASO-101	Classical Sociological Theories	2019	<ol style="list-style-type: none"> 1. This paper seeks to expose the students to the classical thinkers and their contribution in building theoretical sociology. 2. To Compare and contrast the basic theoretical perspectives of sociology 3. To acquaint students with recent trends in Sociological thought.
2	MASO -102	Sociological Research Methods and Statistics	2019	<ol style="list-style-type: none"> 1. This course aims to enable the students to understand the fundamental nature of the scientific approach towards social research and apply the skills in undertaking social research. 2. To equip the students with strategies of

				development for different segments of society. 3. To provide ways and means of understanding and studying social reality
3	MASO -103	Indian Society and Inclusive Growth	2019	1. This paper presents a comprehensive and integrated profile 2. To gain a better understanding of past and present structure and continuity of society 3. Identify and analyze the problems in Indian society and suggest solutions from sociological perspective
4	MASO -104	Participatory Research	2019	1. This paper is to inspire students to undertake research in partnership with stakeholders 2. To explain the emancipatory and empowering, collaborative and reflective approaches 3. To discuss the relationship between PRA and scientific method to incorporate the results to change the practice and policy.
5	MASO -105	Principles of Sociology	2019	1. This paper gives the students an understanding of the basic principles of Sociology as an academic discipline 2. To analyze the ways in which people interact and function in groups 3. It provides a basic knowledge on the fundamental aspects of the important social institutions
6.	MASO -106	Human values and Professional Ethics - 1	2019	1. To help students distinguish between values, skills, and understand the need, basic

				<p>guidelines, content and process of value education</p> <ol style="list-style-type: none"> 2. To provide Human Values and Ethics relating to Religion, Business, Law, Media and Environment 3. To provide an in depth knowledge about the Moral and ethical values for interpretation in their day to day life
7.	MASO -201	Applied Sociology	2019	<ol style="list-style-type: none"> 1. To help students develop clear understanding of key concepts in classical and contemporary sociology and how these concepts relate to some of the perennial themes in the discipline 2. To develop an appreciation of the link between sociological theory and practice 3. To help students master the art of explaining abstract material in clear, precise ways that can be easily understood even by a lay man
8.	MASO -202	Social Demography	2019	<ol style="list-style-type: none"> 1. To introduce the significance of population and its relation to society 2. To provide a theoretical knowledge of the basic concepts of population and changes 3. To enable the students to realize impact of population , changing global scenario, awareness on population control devices and analyse prospects
9.	MASO -203	Rural Sociology and Development	2019	<ol style="list-style-type: none"> 1. This course is to help the students to understand the difference between urban and rural development 2. To analyse the dynamics of rural Indian society in the context of its socio, political and

				<p>economic contradictions</p> <p>3. To evaluate the problems related to development in relation to the needs and aspirations of the marginalized sections</p>
10.	MASO -204	Extension Work	2019	<p>1. This paper expose the students to apply sociological theories and principles in field areas</p> <p>2. To give direct experience of social institutions and social problems through field work</p> <p>3. To train for creative and innovative experiences in social field using research techniques</p>
11	MASO -205	Environmental Sociology	2019	<p>1. This paper aims to provide the students with a comprehensive conceptual, theoretical and empirical backgrounds of interaction between Social world and Nature</p> <p>2. To explore the relationship between human society and the larger natural environment</p> <p>3. To prepare the students for further research in broad areas of environment and natural resource governance from sociological perspective</p>
12	MASO -206	Human Values and Professional Ethics-II	2019	<p>1. To provide knowledge about Value oriented education, Medical ethics, Family values , Ethics and Moral code</p> <p>2. To provide the Business, Environmental and social ethics followed and practiced</p> <p>3. To enhance values of self-esteem and self-respect among students</p>
13	MASO -301	Medical Sociology	2019	<p>1. This course will help the students to understand the concepts of health and illness</p>

				<ol style="list-style-type: none"> 2. To understand the social facts of health and the root causes of illness 3. To apply sociological theories, concepts, and research to experiences of health, illness, health education, public health and the intense public issues related to health
14	MASO -302	Urban Sociology and Development	2019	<ol style="list-style-type: none"> 1. This paper attempts to analyse the urban social world and its dynamics, various theoretical constructs concerning the patterning and growth of towns and cities 2. To understand the various theoretical approaches to urban development and apply them to different aspects of cities 3. To study historical, economic, and political trends that have affected the growth and development of cities
15	MASO -303	Field Work and Extension (Village placement)	2019	<ol style="list-style-type: none"> 1. This paper aims at direct exposure of students to the real world and problems confronting society 2. Students will carry out field work in village for 10 days for practical experience 3. To learn about sociological study techniques like Participatory Rural Appraisal, Sampling, Interview and Extension
16	MASO 304	Generic electives (a) Human Rights	2019	<ol style="list-style-type: none"> 1. To study Human rights and Constitutional framework 2. To recognize the role of human rights in development, theories of development, development and tradeoff on human rights 3. To Understand the social, political, cultural, and comparative construction of human rights history , institutions, discourses, and futures

		(b) Sociology of Gender	2019	<ol style="list-style-type: none"> 1. To examine how society influences understandings and perception of differences between masculinity (what society deems appropriate behaviour for a “man”) and femininity (what society deems appropriate behaviour for a “woman”). 2. To understand influences of gender on identity and social practices. 3. To pay special focus on the power relationships that follow from the established genderorder in a given society and changes over time.
		c) Gerontology	2019	<ol style="list-style-type: none"> 1. This paper aims at understanding physical, psychosocial, and cultural aspects of the aged 2. To understand aging transitions and intergenerational issues at various contexts and its nexus 3. To examine health and illness adjusting to loss and care of persons with chronic illnesses and rehabilitative needs
		(d) Sociology of Andhra Pradesh	2019	<ol style="list-style-type: none"> 1. This paper aims to study the historical outline and emergence of Andhra society 2. To understand the culture and various social movements in Andhra Pradesh 3. To analyze the welfare and developmental programmes of the rural and urban Andhra Pradesh
17	MASO -305	Open elective (a) Social Psychology and Personality Development	2019	<ol style="list-style-type: none"> 1. This paper aims at the understanding the relationship of cognition and attitudes of individual and society 2. To focus on psychological aspects of the

				<p>individual in the context of social behaviour</p> <p>3. To examine group dynamics such as group thinking and decision making, leadership, persuasion, conflict and cooperation)</p>
		(b) Business And Society	2019	<p>1. This paper aims at understanding the concepts of Social economy and knowledge management</p> <p>2. To examine the business community and social responsibility</p> <p>3. To understand the inter-relation among business firms, organizations , public policy, business law and governance</p>
23	MASO -401	Criminology	2019	<p>1. This paper seeks to describe the students about the different types of crime and scope of criminology</p> <p>2. To illustrate the causes of crime and crime rates</p> <p>3. To study the crime scientifically through data on crime, trends and various theoretical approaches</p>
24	MASO-402	Industrial Dynamics	2019	<p>1. This paper aims to provide the students about the structure and process of industrial organizations from sociological perspective</p> <p>2. To deal with the effects of industrialization on Indian social systems and institutions</p> <p>3. To study the internal relations which are connected directly or indirectly with industry</p>
25	MASO-403	Field Work	2019	<p>1. This paper aims at exposing students in analysing the data</p> <p>2. To understand the different variations in viva-</p>

				voce 3. To understand the recent patterns in Practice
26	MASO-404	Generic electives (a) Social Welfare and Welfare Administration	2019	1. This paper aims at understanding the efficiency of resources and services to meet the needs of the individuals, families, groups and communities 2. To understand the problems of Schedule castes, Schedule tribes, Backward classes and Minorities 3. To facilitate social relationship and adjustments necessary for the disadvantaged sections, children, women, youth and elderly
		(b) Social Entrepreneurship Development	2019	1. The aim of this paper is to understand the theoretical positions of the Social entrepreneurship development 2. To be aware of the contemporary approaches to social entrepreneurship 3. To have comprehensive understanding of the context, process and effects of entrepreneurial activities
		(c) Sociological Perspectives	2019	1. This paper aims at the students to compare and contrast basic theoretical perspectives of sociology through rigorous scientific enterprise 2. To sensitize the need for empirically grounded theories 3. To acquaint students with the recent trends in Sociological thought
		(d) Globalization and society	2019	1. This paper aims at the students to understand the nature and dynamics of globalization and social context though various agencies

				<ol style="list-style-type: none"> 2. To analyze the interconnected changes in the economic, cultural, social, and political spheres of society 3. To understand ever-increasing integration of nations, regions, communities
27	MASO-405	Open elective (a) Globalization and Educational Pursuits	2019	<ol style="list-style-type: none"> 1. This paper aims to understand multifaceted nature of globalization and internationalization in the context of higher education 2. To examine key concepts and theories of globalization, international and comparative education 3. To make the students understand the Global citizenship from professional and academic perspective
		(b) Visual Sociology	2019	<ol style="list-style-type: none"> 1. This paper aims at providing the students a new perspective in study of deliberate versus spontaneous behavior 2. To be aware of recording social signals, expressions as spontaneous as possible 3. To organize the recording of reactions and variations that occur as a response to the context

25. Tamil

26. Telugu Studies

27. Urdu

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	URD 101	Mubadiyat-e-Lisaniyat aur Tareeq-e-Zaban-e- Urdu	2019	Course Outcomes: (1) Knowledge of history of basic Urdu Language. (2) Awareness about ancient and modern Indo-Aryan languages. (3) Command over origin and evolution of Urdu language.
2.	URD 102	Dakniyat	2019	Out come (1) Student understands the brief history of Dakani Literature. (2) Student will be able to analyses the writings of Mohd Quli Qutub Shah. (3) Student will learn about the classical genres of Dakani literature.
3.	URD 103	Classiki Nasr	2019	Course Outcomes: (1) Student will be able to understand the early Urdu poetry of Northern India. (2) Understanding the different forms of Urdu Poetry and poets. (3) To knowledge about the distinctive features of Urdu poetry.
4.	URD 104	Arabi Zaban-o-Adab	2019	Course Outcomes: (1) Knowledge about the tradition of humor and satire in Urdu literature. (2) Differentiate between satire and humor in text. (3) Analyze the text and identify the elements of satire and humor

5.	URD 105	Fanne Sher aur Jadeed Asnafa Shairi	2019	<p>Course Outcomes:</p> <p>(1) Able to read, write and understand simple Arabic sentences. (2) Translate simple Arabic sentences. (3) Student will gain brief awareness of Arabic literature</p> <p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of Urdu Qaseeda from Dakani period. (2) Differentiate between the Dakani and Urdu Qaseeda with respect of language, diction and style (3) Understand the salient features of Urdu Qaseeda with special reference to Nusrati, Sauda and Zauq.</p> <p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of Urdu Marsiya. (2) Compare and analyse the Marsiya of Anees and Dabeer. (3) Understand the salient features of Urdu Marsiya of Meer Anees and MirzaDabeer</p>
6.	URD 106	Human Values and Professional Ethics – I	2019	<p>Course Outcomes:</p> <p>(1) Knowledge about tradition of Urdu Drama. (2) Distinguish various forms and techniques of Urdu Drama. (3) Analyses critically the text of Anar kali and Inder Sabha.</p> <p>Course Outcomes:</p> <p>(1) The student would enrich the knowledge about the Urdu poets and writers of Andhra Pradesh and Tamil Nadu. (2) Would understand the features of regional Urdu poets and writers.</p>
7.	URD 107		2019	<p>Course Outcomes:</p> <p>(1) Understand, What are the Human Values accepted globally. (2) Knowing the importance of Human Values in religious scriptures and philosophies.</p>
8.	URD 201	Rayalaseema ka Sher-o-Adab	2019	<p>Course Outcomes:</p> <p>(1) Have learn about the important historical events of Urdu Poetry. (2) Have knowledge about the most important schools of thought of Urdu literature.</p>

9.	URD 202	Classiki Shairi	2019	<p>Out come</p> <p>(1) Student understands the brief history of Dakani Literature.</p> <p>(2) Student will be able to analyze the writings of Mohd Quli Qutub Shah.</p> <p>(3) Student will learn about the classical genres of Dakani literature.</p>
10.	URD 203	Hali : Hayat aur Adabi Khidmat	2019	<p>Out come</p> <p>(1) Student will know about the classics of Urdu prose.</p> <p>(2) Student will be able to read and understand the text.</p> <p>(3) Student will learn critical awareness of the text.</p>
11.	URD 204	Farsi Zaban-o-Adab	2019	<p>Out come</p> <p>(1) Student will know about the classics of Urdu prose.</p> <p>(2) Student will be able to read and understand the text.</p> <p>(3) Student will learn critical awareness of the text.</p>
12.	URD 205	Ghair Afsanavi Adab	2019	<p>Course Outcomes:</p> <p>(1) Student will be able to read, write and understand simple persian sentences.</p> <p>(2) Acquire Knowledge about the Persian poetic writings of Sa'di, Hafiz and Iqbal.</p> <p>(3) Student will gain brief awareness of Persian literature.</p> <p>Course Outcomes:</p> <p>(1) Specialized in the life and contributions of Faiz Ahmed Faiz.</p> <p>(2) Identify the uniqueness of the poetry of Faiz Ahmed Faiz.</p> <p>(3) Understanding the salient features of the poetry of Faiz Ahmed Faiz.</p> <p>Course Outcomes:</p> <p>(1) Specialized in the life and contributions of SulaimanAtherJaweed</p> <p>(2) Contributions of SulaimanAtherJaweed as a critic and columnist.</p> <p>(3) Contributions of SulaimanAtherJaweed as a poet, researcher & writer.</p>

13.	URD 206 206	Human Values and Professional Ethics –II	2019	<p>Course Outcomes:</p> <p>(1) Awareness of literature written in Rayalaseema. (2) Understand the style of new poets of this region. (3) Gain knowledge about two of the prominent prose writers of this area</p> <p>Course Outcomes:</p> <p>(1) Apply the skills of Ilm e bayan and identifying the phrases in poetry. (2) Applying Ilm e Arooz skill in poetry. (3) Build an understanding about the modern genres of Urdu poetry.</p>
14.	URD 207		2019	<p>(1) Awareness about Professional Ethics and its categorization. (2) Understand the importance of Professional Ethics in society. (3) Develop a feeling to become a responsible citizen and a good human being.</p>
15.	URD 301	Jadeed Nasr	2019	<p>(1) Knowledge about the forms and tradition of Urdu Ghazal. (2) Understanding Dakani Ghazal with reference to eminent Dakani poets. (3) Understanding Classiki Ghazal and Jadeed Ghazal with reference to eminent poets in each category</p>
16.	URD 302	Jadeed Nazm	2019	<p>Out comes</p> <p>(1) Understanding the forms of Urdu Nazm. (2) Critically estimate and explain the art and technique of famous Urdu poets. (3) Knowledge about the distinctive features Urdu Nazm</p>

17.	URD 303	Urdu Tanqeed	2019	<p>Out come</p> <p>(1) The learner would understand about the mile stones of Urdu Novel. (2) The learner would understand the technical features of Urdu Novel. (3) The learner would understand about the Urdu Novel writers.</p> <p>Out come</p> <p>(1) Knowledge about tradition of Urdu Afsana. (2) Awareness of literary trends and its impact on Urdu Afsana. (3) Identifying and distinguishing the elements in Urdu Afsana</p> <p>Course Outcomes:</p> <p>(1) The learner would understand about the history of computer. (2) The learner would understand the technical features of Urdu computer. (3) The learner would understand about the Urdu DTP.</p> <p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of Urdu Khud navisht. (2) Distinguish between biography and auto biography. (3) Understand critically the salient features of 2 Urdu biographies :Yadon ki Baraat and Khwab Baqi Hain.</p>
18.	URD 304 A URD 304 B URD 304 C URD 304 D	(a) Sir Syed ka Khusoosi Mutalea (b) Iqbal ka Khusoosi Mutalea (c) Faiz ka Khusoosi Mutalea	2019	<p>(1) The learner will know about the aims and objectives of the Journalism. (2) Distinguish between writings of news paper, radio and television. (3) The learner will know about the different fields of Urdu journalism.</p>

19.	URD 305 A URD 305 B URD 305 C	(a) Urdu Ghazal (b) Jadeed Dakani Shairi (c) Urdu Afsana	2019	(1) Knowledge about Jadeed Dakani Shairi. (2) Understand Jadeed Dakani Shairi and its vocabulary and diction. (3) Critical awareness about 5 eminent poets of Jadeed Dakani. (1) Knowledge about types, techniques and issues of translation. (2) Distinguish between various types of translations. (3) Understand the tradition of Urdu translation and literary translation
20.	URD 401	Urdu Drama	2019	(1) Knowledge of Basic Linguistics. (2) Awareness about ancient and modern Indo-Aryan languages. (3) Command over origin and evolution of Urdu language.
21.	URD 402	Adabi Tehreekat aur Rujhanat	2019	(1) Knowledge about research, types of research and method of research. (2) Distinguish between various types of research writings. (3) Capable for selection of topic, material collection, designing the research work and writing research paper.

22.	URD 403	Tanz –o- Mizah	2019	<p>Out come</p> <p>(1) Knowledge about Literary criticism. (2) Vies and contributions of Hali and Shibli on literary criticism. (3) Understanding 6 schools of literary criticism.</p> <p>Out come</p> <p>(1) Understand the tradition of Ghari Afsanavi Adab and its salient features. (2) Literary importance of Maktoob Nigare and Inshaiya. (3) Literary importance of Khaka and Safarnama.</p> <p>Course Outcomes:</p> <p>(1) Understand the literary contributions of Altaf Husain Hali. (2) Importance and salient features of Mussadas, Muqaddama & Maqalat. (3) Understand the writing style of Hali as a biographer</p> <p>Course Outcomes:</p> <p>(1) Knowledge about form and tradition of Urdu Ghazal. (2) Understanding Dakani Ghazal with reference to 2 Dakani poets. (3) Understanding Classiki Ghazal and Jadeed Ghazal with reference to 2 poets in each category.</p>
23.	URD 404 A URD 404 B URD 404 C URD 404 D	(a) Urdu Tarjuma Nigari (b) Urdu Marsiya (c) Urdu Khudnavisht	2019	<p>Outcomes:</p> <p>(1) Able to know the history and trends of Telugu, Hindi and English languages. (2) Gain the comparative knowledge of various languages and their literature</p>
24.	URD 405 A URD 405 B URD 405 C	(a) Ibtdayi Urdu (b) Tehqeeq - Tariqekar (c) Urdu Qaseeda	2019	<p>Course Outcomes:</p> <p>(1) Specialized in the contributions of Sir Syed Ahmed Khan. (2) Contributions of Sir Syed Ahmed Khan, as literary person and as a educationist. (3) Understanding the contributions of his literary friends</p> <p>Course Outcomes:</p> <p>(1) Specialized in the contributions of Sir Mohammed Iqbal. (2) Contributions of Allama Iqbal with reference to Bal e Jibreel. (3) Understanding the poetic genius of Allama Iqbal..</p>

S.V.U. College of Sciences

28. Anthropology

S. No.	Name of the Programme	Course Code	Title of the Course	Years	Course Outcomes
1	M.Sc. Anthropology	ANO : 101	Introduction to Social Cultural Anthropology	2019	<ul style="list-style-type: none"> a. Exposed to the basic introductory background about Socio-cultural Anthropology, its historical background and relation to other branches b. Provides knowledge about the entire subject matter of the socio-cultural anthropology as well as its different sub-branches. c. Exposed to social institutions d. Know the religion beliefs, rituals and myth
2	M.Sc. Anthropology	ANO : 102	Introduction to Biological Anthropology	2019	<ul style="list-style-type: none"> a. Exposed to the basic concept, meaning and scope of Biological Anthropology b. Explain how human being acts as the central figure of Anthropology c. Elucidate the major divisions of Biological/ physical Anthropology d. Know the inter-relationship between Biological Anthropology and other sciences e. To know how Man evolved in animal kingdom f. To understand how evolution has occurred and what are the evidences

					of evolution and addresses human variation and the causes of variations
3	M.Sc. Anthropology	ANO-103	Introduction to Archaeological Anthropology	2019	<ul style="list-style-type: none"> a. Able to define archaeological anthropology and its branches b. Understand the geological timescale, tool typology and technology c. The Course will explain the basic concepts and terminology used in prehistoric archaeology d. Understand chronological and cultural determinants of Indian and European prehistory
4	M.Sc. Anthropology	ANO-104P	Somatometry & Somatoscopy	2019	
5	M.Sc. Anthropology	ANO 105p	Archaeological Anthropology	2019	
6.	M.Sc. Anthropology	ANO 106	Economic and Political Anthropology	2019	<ul style="list-style-type: none"> a. Able to learn meaning and scope of economic anthropology b. To understand the division of labor by gender and age, exchange of goods and gifts, and to understand the market economy. c. Able to know the historical background of Political Organization besides types and trends of Political Organization including types like i.e. Band, Tribe, Chiefdoms and State d. To know the local institutions: panchayats (traditional and statutory)

7.	M.Sc. Anthropology	ANO 107	Human Values and Professional Ethics -1	2019	
8.	M.Sc. Anthropology	ANO 201	Comparative Ethnography and Indian Anthropology	2019	<ul style="list-style-type: none"> a. To understand the major ethnological regions of the world b. To know the ethnic and linguistic classifications c. Able to understand the traditional Indian culture d. To know the contributions of Indian anthropologists
9.	M.Sc. Anthropology	ANO 202	Principals of Genetics	2019	<ul style="list-style-type: none"> a. understand about the scope of genetics and its historical development b. to learn the biology of cell and cell division c. Exposed to the patterns of the inheritance d. Know about blood groups and their anthropological perspective
10	M.Sc. Anthropology	ANO 203	Research Methods in Anthropology	2019	<ul style="list-style-type: none"> a. To understand the fieldwork traditions in Anthropology b. To understand the concept of research and its purpose c. highlight the conceptual structure of a research design d. understand the various statistical tools in the analysis and interpretation of the data
11	M.Sc. Anthropology	ANO 204P	Craniology and Craniometry	2019	
12	M.Sc. Anthropology	ANO205P	Doing Ethnography	2019	
13	M.Sc. Anthropology	ANO206	Prehistoric India	2019	<ul style="list-style-type: none"> a. learn the regional distribution of

					<p>lower, middle, and upper Paleolithic cultures</p> <p>b. To learn the Mesolithic culture and typo- technology</p> <p>c. Learn the regional distributions of Neolithic cultures</p> <p>d. understand the copper and iron age</p> <p>e. exposed to the distribution of megaliths</p>
14	M.Sc. Anthropology	ANO 207	Human Values and Professional Ethics -II	2019	
15	M.Sc. Anthropology	ANB 301	Human Evolution and Fossil Evidence	2019	<p>a. Understand the evolutionary trends of primates, prosimianms to homosapiens</p> <p>b. To know the hominid evolution</p> <p>c. To know the Neanderthals distributions and extension</p> <p>d. Exposed to the homo sapiens distribution and feature of human species</p>
16	M.Sc. Anthropology	ANB 302	Human Genetics	2019	<p>a. understand the meaning and scope of human genetics</p> <p>b. know methods of studying human chromosomes and chromosomal abnormalities</p> <p>c. depict Inborn errors of metabolism with typical examples and human human ABO blood group system and its fundamentals</p> <p>d. know the concept of “one-gene-one-enzyme hypothesis” which explains</p>

					development of genetic diseases/disorders caused by defective genes controlling the functions of enzymes in metabolic pathways
17	M.Sc. Anthropology	ANB 303P	Human Osteology and Osteometry	2019	
18	M.Sc. Anthropology	ANB 304P	Dermatoglyphics	2019	
19	M.Sc. Anthropology	ANB 305	Anthropological Demography	2019	<ul style="list-style-type: none"> a. Know about the different population growth theories b. Learn the basic demographic variables c. Understand how the different factors regulates the population growth d. Understand the different demographic models e. Learn the genetic consequences of family planning
20	M.Sc. Anthropology	ANB 306	Biostatistics and Computer Applications	2019	<ul style="list-style-type: none"> a. To understand the concept of research and its purpose b. To enlighten the process of research and conceptual structure of a research design c. Understand the disease outcomes through measurement of descriptive, analysis of variance and regression models through computer applications d. Know the use of computers in the analysis data and power point presentation
21	M.Sc. Anthropology	ANB 307	Forensic Anthropology	2019	<ul style="list-style-type: none"> a. able to know about forensic anthropology, a specialized, applied

					<p>branch of physical/biological anthropology which deals with the crime investigation</p> <ul style="list-style-type: none"> b. understand how dermatoglyphic, somatoscopic characteristics and body fluids helpful in crime investigation c. know the use of skeletal remains in forensic investigations d. know the importance of modern methods in crime investigation
22	M.Sc. Anthropology	ANB 308	Palaeoanthropology	2019	<ul style="list-style-type: none"> a. understand the geological time scale and Pleistocene epoch b. know about tool making techniques and tool types c. gain knowledge about dating methods d. learn about Paleolithic, Mesolithic and Neolithic cultures in India
23	M.Sc. Anthropology	ANB 401	Biological Anthropology	2019	<ul style="list-style-type: none"> a. Understand the basic concept, meaning and scope of Biological Anthropology b. Know the biological variation in modern human populations c. Understand the human adaptability and impact of urbanization on humans d. Bio-cultural aspects of health and disease
24	M.Sc. Anthropology	ANB-402	Human Population Genetics	2019	Students will

					<ul style="list-style-type: none"> a. Explain the basic terms/concepts of human population genetics b. Appreciate the mechanisms of evolutionary forces in shaping biological diversity c. Understand the importance of Hardy – Weinberg Equilibrium especially the gene frequency changes with respect to Mutation, Genetic drift, Selection, Gene flow and to investigate them in empirical situations in human populations d. Know about breeding isolation and its implications in human population genetics. e. Understand various mating patterns (inbreeding and types of consanguineous marriages) and measure the inbreeding in families
25	M.Sc. Anthropology	ANB-403P	Advanced Biological Anthropology	2019	
26	M.Sc. Anthropology	ANB 404 P	Fieldwork, Dissertation & Viva-Voce	2019	
27	M.Sc. Anthropology	ANB -405	Human Growth, Physique and Nutrition	2019	<ul style="list-style-type: none"> a. Know about the Differentiate the term growth, maturation and development b. To learn the methods of studying growth and the factors affecting the growth c. To understand the Human Physique and its Relation of Function, Disease and Behavior. d. Know the socio-cultural aspects of nutrition and nutrients in health and

					diseases
28	M.Sc. Anthropology	ANB 406	Applied Biological Anthropology	2019	<ul style="list-style-type: none"> a. Know about various applications of anthropometry and kinanthropometry in various fields b. Understand about the importance of forensic anthropology in crime investigations c. Know the importance genetic counseling, genetic screening, Genetic engineering, treatment of genetic diseases and Gene therapy d. Learn about the human geno project
29	M.Sc. Anthropology	ANB 407	Medical Genetics	2019	<ul style="list-style-type: none"> a. Understand the overplanting areas of anthropology and genetics, anthropology and medicine (Disease) b. Understand the different methods of identification genetic diseases c. Know about epidemiology, socio cultural and ecological dimensions of genetic diseases control and treatment d. Learn the knowledge, attitude and currying practices of genetic diseases
30	M.Sc. Anthropology	ANB-408	Epidemiology	2019	<ul style="list-style-type: none"> a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health. b. Understand the global burden of health outcomes and diseases by

					<p>assessing measures and interpret the prevalence, risk, rate, and odds within the context of epidemiology</p> <p>c. Know about Complications of obesity on health its prevention and control</p> <p>d. Understand the complex web of biological, behavioral, cultural and environmental factors towards the prevalence of communicable infections and chronic infections</p>
31	M.Sc. Anthropology	ANB -409	Human Ecology	2019	<p>a. Exposed to the various ecological settings of human habitat .</p> <p>b. Know the ecological evaluation and adaptation.</p> <p>c. To understand the growth and development in various eco-systems</p> <p>d. Understand the Differential Fertility and Mortality, Survival Indices, quality of Life and Fitness</p>
32	M.Sc. Anthropology	ANS 301	Theories of Culture	2019	<p>a. Understand the Conceptual Contributions of E. B. Tylor, B. Malinowski, A. L. Kroeber, L. White, Unilineal Evolution (L. H. Morgan and E. B. Tylor); Multilineal Evolution (J. Steward); Universal Evolution (L. White)</p> <p>b. To know the British School; German-Austrian School; American – Distribution School of culture</p> <p>c. Know the Patterns of Culture (R. Benedict); Basic Personality, Model Personality (Kardiner, Linton, Cora</p>

					Dubois); Selfhood (Murphy); Symbolic (G. Obeyesekere) d. understand the historical approaches of culture
33	M.Sc. Anthropology	ANS 302	Social Anthropology of Complex Societies	2019	a. Learn the meaning and approach of great and little traditions b. learn about the peasant societies and contemporary peasant societies c. know the culture of poverty, institution and complex societies d. understand problems of urbanization and social changes
34	M.Sc. Anthropology	ANS 303P	Participatory of Research methods in Development Process	2019	
35	M.Sc. Anthropology	ANS 304P	Non-Governmental Organizations and Extension studies	2019	
36	M.Sc. Anthropology	ANS 305	Ecological Anthropology	2019	a. Understand the environment and ecosystem in understanding the cultural modifications b. Know about the cultural ecology, cognitive ecology, single unified ecology, and ethno ecology. c. Learn issues and prospects on development projects and displacement d. Understand Biodiversity for sustainable development Knowabout Ecological protest movements (Chipko and Narmada Bachao Andolan (NBA));
37	M.Sc. Anthropology	ANS 306	Applied Anthropology- Indigenous Communities	2019	a. Know the Similarities and Differences between Applied and

					<p>Action Anthropology, Indigenous communities and applied anthropology. Indigenous rights.</p> <ul style="list-style-type: none"> b. Know the process of acculturation and assimilation, socialization c. Know about applications of Anthropology in the management of health, agriculture, education and biodiversity and poverty eradication d. Gain the knowledge on tribal welfare, tribal problems, forest and property rights, shifting cultivation and tribal movements
38	M.Sc. Anthropology	ANS 307	Anthropology of Religion Sacred complexes in India	2019	<ul style="list-style-type: none"> a. Know about meaning and relation with power and political leverages, ethnic identity and other aspects of culture in tradition and modern societies b. Know the different anthropological theories of religion c. Know the issues of right of food among by Hindus, five symbols of sikh identity, Aspects of sarora ritual and Shamansism, and Christianity in India d. To understand Contemporary issues of religious violence, secularism and fundamentalism
39	M.Sc. Anthropology	ANS 308	Anthropology and Career Promotion	2019	<ul style="list-style-type: none"> a. Understand the anthropology in competitive examinations b. Know about participatory research

					<p>appraisal</p> <p>c. Exposed to the issues in tribes, tribal problems and cast populations</p> <p>d. Learn the books to be consulted, review of questions and scheme of valuation</p>
40	M.Sc. Anthropology	ANS 401	Structural Anthropology	2019	<p>a. Know the social structure and function of culture</p> <p>b. Understand about the ideal and real social structure and social organization</p> <p>c. Know the general notion of structuralism</p> <p>d. Learn the symbols and structure</p>
41	M.Sc. Anthropology	ANS-402	Medical Anthropology	2019	<p>a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health.</p> <p>b. Understand the etiology, control of infections and non-infections diseases</p> <p>c. Understand the ethno-medicine in the management of health and illness behavior</p> <p>d. Understand the modern medical systems and health care delivery services</p>
42	M.Sc. Anthropology	ANS-403P	Computer Applications	2019	
43	M.Sc. Anthropology	ANS 404 P	Fieldwork, Dissertation & Viva-	2019	

			Voce		
44	M.Sc. Anthropology	ANS -405	Developmental Anthropology	2019	<ul style="list-style-type: none"> a. Know about the Concept of Development and Sustainable Development b. Understand the steps in project preparation, goals, process of implementation and monitoring. c. Role of government, NGOs and peoples participation in development d. Know the watershed management and irrigation, resettlement,(Narmada) poverty Alleviation (Velugu); Primary Education (VECs
45	M.Sc. Anthropology	ANS 406	Culture and Management	2019	<ul style="list-style-type: none"> a. Know the concept of organizational culture. Its links with cultural anthropology Organizational ethnography. Anthropology of work b. Understand the Theories of organizational culture. Different anthropological traditions c. Know the How culture affect management Changes in management styles Future outlook. d. To understand the Ethno methodological approaches, Organizational symbolism. Integration, differentiation and fragmentation as three perspective approaches to organizational culture
46	M.Sc. Anthropology	ANS 407	Anthropology of Displaced Populations	2019	<ul style="list-style-type: none"> a. Know the peoples perception towards development and displacement b. Understand the role of government and non-government agencies in the

					<p>process of displacement, resettlement and rehabilitation.</p> <p>c. Understand policy issues relating development and displacement in legal implications of displacement and rehabilitation</p> <p>d. Learn the Socio-Cultural effects of displacement, Socio disorganization, process of disintegration and reintegration</p>
47	M.Sc. Anthropology	ANS-408	Visual Anthropology	2019	<p>a. Know about the concept, scope and Historical Development of visual anthropology</p> <p>b. Know about the appraisal of ethnographic films in cultural context</p> <p>c. Knowledge about descriptive studying of Visual data produced by Cultures</p> <p>d. To understand the ethnographical films, still photos film shootings and commentary</p>
48	M.Sc. Anthropology	ANS -409	Urban Anthropology	2019	<p>a. Exposed to the history of urbanization.</p> <p>b. Understand the environment and ecological processes of urban</p> <p>c. Understand the urbanization and industrialization on cultural complexity</p> <p>d. Understand the relevance of anthropology to urban industry, Business and Corporate Sectors;</p>

					Urbanization and Social Change in India.
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29. Biochemistry

S.No.	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	BCH101	Biochemical and Biophysical methods	2019	<ol style="list-style-type: none"> 1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research. 2. Learn about basic Radioactivity principles, measurement method and its biological applications. 3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields. 4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques
2	BCH 102	Molecular Physiology and community nutrition	2019	<ol style="list-style-type: none"> 1. Gain the knowledge about circulatory and excretory systems. 2. Know the importance of muscular and nervous system. 3. Health benefits and malnutrition of proteins and fats. 4. Know the importance of nutrition in maintenance of health and diseases.
3	BCH 103P	Practical related to Biochemical Preparations and Analysis	2019	<ol style="list-style-type: none"> 1. Learn safety and precautionary measures for working in a laboratory. 2. Develop skill and proficiency in preparation of laboratory reagents and Use of handling of glass wares, minor equipment for conducting experiments 3. Acquire practical training for qualitative and quantitative analysis of biological materials/molecules and their estimation using multiple methods.

				4. Gain the knowledge about isolation studies of biological samples.
4	BCH 104P	Practical related to Analytical methods	2019	<ol style="list-style-type: none"> 1. Learn how to standardize various biomolecules. 2. Separate biomolecules by paper chromatography and thin layer chromatography 3. Demonstrate separation of protein by electrophoresis. 4. Isolation and spectrophotometric characterization of plant pigments.
5	BCH 105P	Human values and Professional ethics-I	2019	<ol style="list-style-type: none"> 1. Easily understand the Need and Importance of Professional Ethics- Goals- Ethical Values in various Professions. 2. Analyse the basic moral concepts- right , ought, duty, obligation, justice, responsibility and freedom. 3. Know about Purusharthas, Dharma, Artha, Kama, Moksha. 4. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavratas and anuvratas 5. Gain the knowledge about views on Manu and Yajnavalkya
6	BCH 106	Cell and Biomolecules	2019	<ol style="list-style-type: none"> 1. Easily understand the difference between prokaryotic and eukaryotic cells, and the concept of cell division. 2. Understand the classification, structure and biochemical reactions of amino acids and proteins. 3. Describe the classification, structure and biochemical reactions of carbohydrates and lipids. 4. Understand the concept of structural organization of nucleic acids
7	BCH 201	Energy metabolism	2019	<ol style="list-style-type: none"> 1. Explain the broad outlines of intermediary metabolism and importance of carbohydrate metabolism in life. 2. Describe the importance of Electron transport and ATP production mechanism. 3. Gain in knowledge in Carbohydrate metabolism and their associated disorders. 4. Describe the details of lipid metabolism.

8	BCH 202	Metabolism of Nitrogen based molecules	2019	<ol style="list-style-type: none"> 1. Understand the anabolic and catabolic reactions of proteins and aminoacids. 2. Gain knowledge in the importance of aminoacids as biosynthetic precursors. 3. Know the biosynthesis and degradation of purine and pyrimidines and their associated disorders. 4. How toxic chemicals are metabolised by the body through detoxification and the mechanism of carcinogenicity.
9	BCH 203P	Practical related to Enzymology	2019	<ol style="list-style-type: none"> 1. Learn about estimation of various enzymes in biological sample. 2. Learn to perform assay of clinically important enzyme: serum acid and alkaline phosphatase, serum LDH. 3. Learn about the factors affecting enzyme activity and determination of K_m. 4. Demonstrate the Immobilization of enzymes.
10	BCH 204P	Practical related to Molecular Biology	2019	<ol style="list-style-type: none"> 1. Isolate nucleic acids from various sources. 2. Estimate the nucleic acids quantitatively. 3. Determine the melting temperature. 4. Determine the purity of DNA by UV method.
11	BCH 205	Human values and Professional ethics-II	2019	<ol style="list-style-type: none"> 1. Easily understand the Components, Structure and responsibilities of family and status of women in family and society. 2. To get an idea on Ethical issues in relation to health care professionals and patients and genetic engineering, Social justice in health care, Human cloning. 3. To know about Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics. 4. Understand the Ethical theory, Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population.

				5. Gain the knowledge about Organ trade, Human trafficking, Human rights violation and social disparities, Feminist ethics, Surrogacy/ pregnancy.
12	BCH 206	Enzymology	2019	<ol style="list-style-type: none"> 1. Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms. 2. Describe the concepts of enzyme inhibition and mechanism of enzyme catalysis. 3. Students will acquaint with mechanism of enzyme action and various coenzymes involved in the biochemical reactions taking place in living systems. 4. Describe the concepts of co-operative behavior and allosteric regulation.
13	BCH 301	Microbial Biochemistry and Genetics	2019	<ol style="list-style-type: none"> 1. Understand the basics of microbiology like nomenclature and classification of microorganisms, understand the various biological and non-biological method to control microorganisms 2. The student will learn about different mode of nutrition in microorganisms and about viruses - Isolation, purification and characterization. 3. Understand the basics of genetics and the gene arrangement in prokaryotes and eukaryotes. 4. Gain knowledge in bacterial genetics includes the different types plasmids, recombination in bacteria, bacteriophages and bacterial defense mechanism(CRISPR) and Describe the various types of mutations and its effect.
14	BCH 302	Molecular Biology	2019	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learn about the mechanism and regulation of transcription in prokaryotes and eukaryotes.

				<ol style="list-style-type: none"> Learn about genetic code and their evolution. Gain knowledge in Different stages and components of protein synthesis.
15	BCH 303P	Practical related to Microbiology	2019	<ol style="list-style-type: none"> Handle the microscope. Learn Methods of sterilization and preparation of various culture media, Purification techniques. Identification of isolated bacteria, and Growth curve of microorganism. Learn Staining techniques for bacteria and yeast. Gain knowledge in the Preparation of wine from Grapes. Production and estimation of alcohols, citric acid, lactic acid etc.
16	BCH 304P	Practical related to Clinical Biochemical Analysis	2019	<ol style="list-style-type: none"> Collect and maintain the biological samples for clinical assay. Estimate the blood and serum enzymes for diagnosis of diseases. Qualitatively analyse the abnormal constituents in urine. Work with diagnostic kits
17	BCH 305 Generic Elective (Two papers out of three)	<ol style="list-style-type: none"> Molecular Endocrinology Clinical Biochemistry Cell and Developmental Biology	2019	<ol style="list-style-type: none"> Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones.
18	BCH 305 B	Clinical Biochemistry	2019	<ol style="list-style-type: none"> Maintain clinical biochemistry laboratory, biological specimen collection for clinical assay and investigation of disorders associated with carbohydrates. Learn and understand the Inborn errors of amino acid metabolism, Lipid metabolism and Renal function system. Gain knowledge in clinical enzymology and Disorders of Gastrointestinal Tract. Investigate the serum enzymes in liver

19	BCH-305c	Cell and Developmental Biology	2019	<ol style="list-style-type: none"> 1. Acquire knowledge on basic concepts of Developmental Biology. 2. Gain the proficient knowledge about zygote formation, blastula formation, gastrulation and many events in early development. 3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants. 4. Acquire knowledge about biomembrane concept and various membrane transport systems
20	BCH 306 Open Elective to others	<p>a) General Biochemistry</p> <p>b) Environmental Biochemistry</p>	2019	<ol style="list-style-type: none"> 1. Understand the classification, structure and biochemical reactions of aminoacids and proteins. 2. Describe the classification, structure and biochemical reactions of carbohydrates and lipids. 3. Understand the concept of structural organization of nucleic acids. <ol style="list-style-type: none"> 1. Describe the Structure of porphyrins, Chemistry and functions of water and fat soluble vitamins. 2. Students will be able to know how to conserve natural resources for future. 3. Students will be able to describe differing types of <i>ecosystems</i> and their characteristic features. 4. Gain the knowledge about different types of pollution in the environment. 5. Know the Relation between human population and environment. <ol style="list-style-type: none"> 1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research. 2. Learn about basic Radioactivity principles, measurement method and its biological applications. 3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields.

		c)Experimental aspects related to analytical methods		4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques
21	BCH 401	Genetic Engineering	2019	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes, vector construction. 2. Understand the mechanisms of regulation of gene expression in different operons. 3. Know the techniques for transfer and expression of cloned gene and 4. Apply the knowledge of genetic engineering in biological research. 5. principle, Bioinstrumentation and applications of spectroscopy techniques.
22	BCH 402	Technical Writing, Biostatistics and Bioinformatics	2019	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about biological data and database search tools. 4. Acquire hands on training on various computational tools and techniques employed in biological sequence analysis
23	BCH 403P	Practical related to Immunology and Hematology	2019	<ol style="list-style-type: none"> 1. Collect the blood samples and handle the microscope. 2. Analyze the blood samples. 3. Expert in immunodiffusion and immunoelectrophoresis techniques
24	BCH 404P	Practical/Project work	2019	
25	BCH 405 Generic Elective	a) Immunology	2019	<ol style="list-style-type: none"> a. Gain knowledge on different types of antigens, antibodies and how different types of antibodies are produced. b. Out line, compare and contrast the key mechanism of innate and

		<p>b) Applied Biochemistry</p> <p>c) Plant Biochemistry</p>		<p>adaptive immunity.</p> <p>c. Gain knowledge on undesirable immunological reactions and their complication in health management.</p> <p>d. 4. Apply knowledge in disease diagnosis through serological tests.</p> <p>1. Gain knowledge in Fermentation Technology and industrial production of chemicals.</p> <p>2. Learn Industrial application of Enzyme Technology.</p> <p>3. Gain knowledge in Applications of hybridoma technology.</p> <p>4. Understand the applications of genetic engineering in biotechnology and Genetically Modified Organisms.</p> <p>5. Understand the Structure, function and mechanisms of action of phytochromes, cryptochromes and phototropins;</p> <p>1. Gain knowledge in special features of secondary plant metabolism.</p> <p>2. Know the evolutionary studies Origin of basic biological molecules.</p> <p>3. Understand the Concepts of natural evolution and population genetics.</p>
26	BCH 406 Open Elective to others (For other department students)	a) Research Methodology	2019	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Learn to apply hypothesis testing via some of the statistical distributions.</p> <p>3. Develop understanding about Biological data and database search tools.</p> <p>4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis</p>

		b) Biochemistry of diseases		<p>1 Maintain clinical biochemistry laboratory, biological specimen collection for clinical assay and investigation of disorders associated with carbohydrates.</p> <p>2 Learn and understand the Inborn errors of amino acid metabolism, Lipid metabolism and Renal function system.</p> <p>3 Gain knowledge in clinical enzymology and Disorders of Gastrointestinal Tract.</p> <p>4. Investigate the serum enzymes in liver diseases</p>
27		C) Nutritional Biochemistry	2019	<p>1. Determine the body composition and body weight by using various methods.</p> <p>2. To describe the importance of protein and fats.</p> <p>3. Gain knowledge on vitamins and minerals to maintain health.</p> <p>4. Acquire knowledge on nutritional importance in different ages in the life</p>

Immuno technology

S.No.	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	Core 1	Biochemical and Biophysical methods	2019	<p>1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research.</p> <p>2. Learn about basic Radioactivity principles, measurement method and its biological applications.</p> <p>3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields.</p> <p>4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques</p>

2	Core 2	Molecular Physiology and community nutrition	2019	<ol style="list-style-type: none"> 5. Gain the knowledge about circulatory and excretory systems. 6. Know the importance of muscular and nervous system. 7. Health benefits and malnutrition of proteins and fats. 8. Know the importance of nutrition in maintenance of health and diseases
3	Core 3P	Practical related to Biochemical Preparations and Analysis	2019	<ol style="list-style-type: none"> 1. Learn safety and precautionary measures for working in a laboratory. 2. Develop skill and proficiency in preparation of laboratory reagents and Use of handling of glass wares, minor equipment for conducting experiments 3. Acquire practical training for qualitative and quantitative analysis of biological materials/molecules and their estimation using multiple methods. 4. Gain the knowledge about isolation studies of biological samples.
4	Core 4P	Practical related to Analytical methods	2019	<ol style="list-style-type: none"> 1. Learn how to standardize various biomolecules. 2. Separate biomolecules by paper chromatography and thin layer chromatography 3. Demonstrate separation of protein by electrophoresis. 4. 4. Isolation and spectrophotometric characterization of plant pigments
5	Compulsory Foundation	Cell and Biomolecules	2019	<ol style="list-style-type: none"> 6. Easily understand the difference between prokaryotic and eukaryotic cells, and the concept of cell division. 7. Understand the classification, structure and biochemical reactions of aminoacids and proteins. 8. Describe the classification, structure and biochemical reactions of carbohydrates and lipids. 9. Understand the concept of structural organization of nucleic acids.
6	Elective foundation	Human values and Professional ethics-I	2019	<ol style="list-style-type: none"> 10. Easily understand the Need and Importance of Professional Ethics- Goals- Ethical Values in various

				<p>Professions.</p> <ol style="list-style-type: none"> 11. Analyse the basic moral concepts- right , ought, duty, obligation, justice, responsibility and freedom. 12. Know about Purusharthas, Dharma, Artha, Kama, Moksha. 13. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavratas and anuvratas. 14. Gain the knowledge about views on Manu and Yajnavalkya.
7	Core 1	Energy metabolism	2019	<ol style="list-style-type: none"> 1. Explain the broad outlines of intermediary metabolism and importance of carbohydrate metabolism in life. 2. Describe the importance of Electron transport and ATP production mechanism. 3. Gain in knowledge in Carbohydrate metabolism and their associated disorders. 4. Describe the details of lipid metabolism.
8	Core 2	Metabolism of Nitrogen based molecules	2019	<ol style="list-style-type: none"> 1. Understand the anabolic and catabolic reactions of proteins and aminoacids. 2. Gain knowledge in the importance of aminoacids as biosynthetic precursors. 3. Know the biosynthesis and degradation of purine and pyrimidined and their associated disorders. 4. How toxic chemicals metabolised by the body through detoxification and the mechanism of carcinogenicity.
9	Core 3	Practical related to Enzymology	2019	<ol style="list-style-type: none"> 5. Learn about estimation of various enzymes in biological sample. 6. Learn to perform assay of clinically important enzyme: serum acid and alkaline phosphatase, serum LDH. 7. Learn about the factors affecting enzyme activity and determination of Km. 8. Demonstrate the Immobilization of enzymes

10	Core 4	Practical related to Molecular Biology	2019	<ol style="list-style-type: none"> 1. Isolate DNA from bacterial, plant and animal cells and RNA from yeast cells. 2. Estimate concentrations of DNA and RNA by conventional methods and UV absorption methods. 3. Determine the melting temperature(T_m) of DNA. 4. Learn procedures for isolation of phage M_{13} and single and double standard M_{13}DNA.
11	Compulsory Foundation	Enzymology	2019	<ol style="list-style-type: none"> 1. Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms. 2. Describe the concepts of enzyme inhibition and mechanism of enzyme catalysis. 3. Students will acquaint with mechanism of enzyme action and various coenzymes involved in the biochemical reactions taking place in living systems. 4. Describe the concepts of co-operative behaviour and allosteric regulation
12	Elective foundation	Human values and Professional ethics-II	2019	<ol style="list-style-type: none"> 6. Easily understand the Components, Structure and responsibilities of family and status of women in family and society. 7. To get an idea on Ethical issues in relation to health care professionals and patients and genetic engineering, Social justice in health care, Human cloning. 8. To know about Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics. 9. Understand the Ethical theory, Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population. 10. Gain the knowledge about Organ trade, Human trafficking, Human rights violation and social disparities, Feminist ethics, Surrogacy/ pregnancy
13	Core 1	Microbial Biochemistry and Genetics	2019	<ol style="list-style-type: none"> 1. Understand the basics of microbiology like nomenclature and classification of microorganisms and different modes of nutrition in microorganisms.

				<p>2. Learn and understand the various biological and non-biological methods to control microorganisms and Biology of subviral agents – Viroids, Prions, Satellite viruses.</p> <p>3. Understand the basics of genetics and the gene arrangement in prokaryotes and eukaryotes.</p> <p>4. Gain knowledge in bacterial genetics like different types plasmids, recombination in bacteria, bacteriophages and bacterial defense mechanism (CRISPR) and various types of mutations and their effects</p>
14	Core 2	Immunology	2019	<p>1. Gain knowledge on different types of antigens, antibodies and how different types of antibodies are produced.</p> <p>2. Out line, compare and contrast the key mechanism of innate and adaptive immunity</p> <p>3. Gain knowledge on undesirable immunological reactions and their complications in health management</p> <p>4. Apply knowledge in disease diagnosis through serological tests</p>
15	Core 3	Practical related to Microbiology	2019	<p>1. Handle the microscope.</p> <p>2. Learn Methods of sterilization and preparation of various culture media, Purification techniques.</p> <p>3. Identification of isolated bacteria, and Growth curve of microorganism.</p> <p>4. Learn staining techniques for bacteria and yeast.</p> <p>5. Gain knowledge in the Preparation of wine from Grapes.</p> <p>6. Production and estimation of alcohols, citric acid, lactic acid etc</p>
16	Core 4	Practical related to Immunology	2019	<p>1. Perform RBC, WBC count and differential count.</p> <p>2. Do all haematological tests that will be done in clinical labs.</p> <p>3. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc.</p> <p>4. Do Heme agglutination tests for identification of different antigens</p>
17	Generic	a) Molecular Biology	2019	<p>1. The students will learn about the Possible modes of</p>

	Elective (Two papers out of three)			<p>replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication.</p> <p>2. Learn about the mechanism and regulation of transcription in prokaryotes and eukaryotes.</p> <p>3. Learn about genetic code and their evolution.</p> <p>4. Gain knowledge in Different stages and components of protein synthesis</p>
		b)Molecular Endocrinology		<p>1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands.</p> <p>2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands.</p> <p>3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones.</p> <p>4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones.</p>
		c)Cell and Developmental Biology		<p>1. Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion, Apoptosis, Senescence, integrins .</p> <p>2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development.</p> <p>3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants.</p> <p>4. Gain knowledge about Miscelle, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis.</p>
18	Open Elective to others	a) Basics of Immunology	2019	<p>1. Gain knowledge on essential features of different types of antigens, antibodies.</p> <p>2. Out line, compare and contrast the key mechanism of innate</p>

	(For other department students)			<p>and adaptive immunity.</p> <ol style="list-style-type: none"> 3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation. 4. Apply knowledge in disease diagnosis through serological tests.
		b) Immunotechniques		<ol style="list-style-type: none"> 1. To purify and analyse the antigens and antibodies. 2. To apply different Hybridization techniques and ELISA, RIA. 3. To detect various diseases by application of antiisera. 4. To engineer antibodies and catalytic antibodies and produce drugs to allergies
19	Core 1	Microbial Biochemistry and Genetics	2019	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes, vector construction. 2. Understand the mechanisms of regulation of gene expression in different operons. 3. Know the techniques for transfer and expression of cloned gene and 4. Apply the knowledge of genetic engineering in biological research
20	Core 2	Immunology	2019	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about Biological data and database search tools. 4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis

21	Core 3	Practical related to Microbiology	2019	<ol style="list-style-type: none"> 1. Use diagnostic kits to test different types of auto immune diseases. 2. Prepare Rabbit for performance of immunological studies. 3. Perform Single Radial Immunodiffusion. 4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc. 5. Do Heme agglutination tests for identification of different antigens
22	Core 4	Practical related to Immunology	2019	<ol style="list-style-type: none"> 1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 2. Learn structure, function of gene and its transfer methods 3. Develop understanding on cause, spread and control of diseases caused by different microorganisms 4. Get knowledge on collection of data, thesis writing.
23	Generic Elective (Two papers out of three)	a) Molecular Biology	2019	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learn about the mechanism and regulation of transcription in prokaryotes and eukaryotes. 3. Learn about genetic code and their evolution. 4. Gain knowledge in Different stages and components of protein synthesis
		b) Molecular Biology	2019	<ol style="list-style-type: none"> 1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands. 2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands.

				<p>3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones.</p> <p>4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones</p>
		c) Cell and Developmental Biology	2019	<p>1.Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion, Apoptosis, Senescence, integrins .</p> <p>2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development.</p> <p>3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants.</p> <p>4. Gain knowledge about Miscelle, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis</p>
24	Open Elective to others (For other department students)	c) Basics of Immunology Immunotechniques	2019	<p>1. Gain knowledge on essential features of different types of antigens, antibodies.</p> <p>2. Out line, compare and contrast the key mechanism of innate and adaptive immunity.</p> <p>3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation.</p> <p>4. Apply knowledge in disease diagnosis through serological tests.</p>
25	Open Elective (b)	<i>Immunotechniques and their Applications</i>	2019	<p>1. To purify and analyse the antigens and antibodies.</p> <p>2. To apply different Hybridization techniques and ELISA, RIA.</p> <p>3. To detect various diseases by application of antiisera.</p> <p>4. To engineer antibodies and catalytic antibodies and</p>

				produce drugs to allergies.
26	Core 1	<i>Genetic Engineering</i>	2019	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes, vector construction. 2. Understand the mechanisms of regulation of gene expression in different operons. 3. Know the techniques for transfer and expression of cloned gene and 4. Apply the knowledge of genetic engineering in biological research
27	Core 2	<i>Technical Writing, Biostatistics and Bioinformatics</i>	2019	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about Biological data and database search tools. 4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis.
28	Core 3 P	<i>Practical related to Clinical Immunology, Biostatistics and Bioinformatics</i>	2019	<ol style="list-style-type: none"> 1. Use diagnostic kits to test different types of auto immune diseases. 2. Prepare Rabbit for performance of immunological studies. 3. Perform Single Radial Immunodiffusion. 4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc. 5. Do Heme agglutination tests for identification of different antigens
29	Core 4	<i>Project Work</i>	2019	<ol style="list-style-type: none"> 1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 2. Learn structure, function of gene and its transfer methods 3. Develop understanding on cause, spread and control of diseases caused by different microorganisms 4. Get knowledge on collection of data, thesis writing

30	Generic Elective (a)	<i>Clinical Immunology</i>	2019	<ol style="list-style-type: none"> 1. Understand different types of immunity and components of the Immune System. 2. Gain knowledge on auto immune diseases, Animal models used to study them and the treatment for them. 3. Familiar with Clinical manifestation of graft rejection, general immunosuppressive therapy and immune tolerance to allografts. 4. Acquire the knowledge on oncogenes, Psychoimmunology and neuroimmunomodulation
31	Generic Elective (b)	<i>Applied And Molecular Immunology</i>	2019	<ol style="list-style-type: none"> 1. Develop skill in production of monoclonal antibodies. 2. How better enzyme immobilization enhances its activity and their industrial and clinical applications. 3. Familiar with different types of vaccines and how they help in prevention of diseases. 4. Acquire the knowledge on IPR and procedures for patent filing
32	General Elective (C)	<i>Immunopharmacology</i>	2019	<ol style="list-style-type: none"> 1. Understand about drug receptors, pharmacodynamics, pharmacokinetics, drug biotransformation. 2. Acquire knowledge on Immunomodulation therapy, malignancy therapy. 3. Gain knowledge on Prostaglandins, thromboxanes, leukotrienes and inhibitors of these molecules formation. 4. Familiar with Nitric oxide and its immunological effects.
33	Open Elective a	<i>Research Methodology</i>	2019	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Acquire hands on training on various computational tools and techniques. 3. Learn to apply hypothesis testing via some of the statistical distributions. 4. To acquire knowledge on research proposals and motivate students towards research
34	Open Elective (b)	<i>Immunological Diseases and Therapeutics</i>	2019	<ol style="list-style-type: none"> 1. Maintain the Clinical Immunology lab with all required standards. 2. Outline, compare and contrast the key mechanism of innate and adaptive immunity.

				<p>3. Gain knowledge on different types of immunodeficiencies, their treatment and about autoimmune disorders.</p> <p>4. Familiar with Clinical manifestation in graft acceptance or rejection and how immunosuppressive therapy is useful. And about cancer immunotherapy.</p>
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30. Botany

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	BOT-101	Algae, Bryophytes, Pteridophytes and Gymnosperms	2019	<ol style="list-style-type: none"> 1. The student able to distinguish different species of lower plant groups. 2. Cultivation methods of Algae for industrial production of Single Cell Proteins, Agar Agar ,carragin and Neutraceuticals.Discuss the importance of morphological structure, classification, reproduction and economic importance of Algae.
	BOT-102	Taxonomy of Angiosperms	2019	<ol style="list-style-type: none"> 1) Plant identification skills 2) Herbaria preparation and documentation.
	BOT-103	Microbiology	2019	<ol style="list-style-type: none"> 1. Isolation and identification of Pathogenic and Non-Pathogenic micro-organisms. 2. Methods of cultivation of economically/industrially important microorganisms. 3. Plant decease identification and control methods.
	BOT-104	Human Values and Professional Ethics - I	2019	<ol style="list-style-type: none"> 1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.

				3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
	BOT-105P	Practical-I Algae, Bryophytes, Pteridophytes and Gymnosperms & Taxonomy of Angiosperms	2019	1) Identification of different Algal forms 2) Morphological description and use of Floral Keys for plant identification.
	BOT-106P	Practical-II Microbiology & Plant Development and Reproduction	2019	2. Isolation, culture and staining methods for identification of micro-organisms. 3. Diagnosis of Plant deceases based on symptoms and control methods. 3. Histology of vegetative and reproductive structures and isolation
	BOT-201	Plant Ecology	2019	1) Concepts of Ecology Students, relation between biotic and abiotic factors in an ecosystem. 2) Interaction between biotic communities and ecological energetics 3) Environmental pollution, Global warming and Environmental protection strategies and green energy production
	BOT-202	Plant Biochemistry and Metabolism	2019	1) Biosynthesis of plant primary metabolites and chemistry. 2) Plant physiological processes water relation, plant nutrition and energy metabolism, 3) Metabolic changes in response to biotic and abiotic stress
	BOT-203	Plant Development and Reproduction	2019	1. Wood formation and types 2. Reproductive structures. Mode of Reproduction
	BOT-204	Human Values and Professional Ethics - II	2019	1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people

				of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
	BOT-205P	Practical-I Plant Biochemistry and Metabolism & Phytobiodiversity and Conservation	2019	1. Plant metabolite analysis and metabolic enzyme activity 2. Methods for Phytodiversity analysis.
	BOT-206P	Practical-II Plant Ecology & Cell Biology, Genetics and Evolution	2019	1) Plant communities 2) Methods for analysis of environmental pollutants 3) Designs of waste water treatment plants. 4) Assessment of effect of Global warming on Plant systems 5) Study of chromosomal morphology and behavior in Mitosis and Meiosis 6) Practical Problem solving on genetic concepts
	BOT-301	Molecular Biology And Techniques	2019	1. Nucleic acids properties and mechanism of DNA replication and damage repair, and Chromatin organization and Cell Cycle regulation 2. Gene expression, processing of Transcripts and Proteins, and mechanisms of regulation of gene expression in Prokaryotes and Eukaryotes. 3. Principles of Microscopy, Nucleic acid and protein separation and identification techniques and methods
	BOT-302	Biodiversity and Conservation	2019	1. Knowledge on Phytodiversity, biodiversity centres and types of Biodiversity. 2. Phytodiversity analysis using Remote sensing 3. Causes for the loss of phytodiversity and conservation strategies
	BOT-303 IE	Biosystematics	2019	1. Biosystematic Categories, 2. Omega Taxonomy 3. Taximetrics and Concept of Species

	BOT-304IE	Molecular Plant Pathology	2019	<ol style="list-style-type: none"> 1. Symptoms based Diagnosis of Plant Diseases 2. Methods of Plant Disease Management and pest control
	Abot-306	Computer Applications and Bioinformatics	2019	<ol style="list-style-type: none"> 1. Computer Operating systems and MS Office 2. The biological databases and Databases 3. Bioinformatics, tools and its applications.
	BOT-307 IE	Plants and Human Welfare	2019	<ol style="list-style-type: none"> 1. Food Yielding Plants as a source of food, fiber and timber. 2. Plants used in curing human diseases and other ailments in traditional medical systems and Veterinary diseases 3. Spices and condiments, Non timber forest products. 4. Preparation and application of Bio fertilizers, Bio pesticides, Bio insecticides, mushroom cultivation and plant based preservatives
	BOT-308 IE	Organic Farming and Mushroom Cultivation	2019	<ol style="list-style-type: none"> 1. Different types of compost preparation and their Nutritive value. 2. Biofertilizers and organic preparations, their marketing and farm management. 3. Vermicompost Technology 4. Identification of types of edible and poisonous mushrooms. 5. Method of cultivation of mushrooms and diseases management
	BOT-309 IE	Gardening and Nursery Techniques	2019	<ol style="list-style-type: none"> 1. Nurseries development and Management and Garden designing for different plant groups 2. <i>In vivo</i> and <i>in vitro</i> plant propagation methods 3. Plant nutrition and protection 4. Types of gardens and nurseries
	Practical-I	Molecular Biology And Techniques ; Biodiversity and Conservation	2019	<ol style="list-style-type: none"> 1.. Study of Chromosomal Behavior during Mitosis. 2. Isolation of DNA, RNA and proteins, Quantitative estimation 3. Assignments on DNA structure, Replication and Gene expression 4. Methods for Phytodiversity analysis. 5. Plant diversity conservation methods
	Practical-II	Biosystematics / Molecular Plant	2019	<p>Biosystematics</p> <ol style="list-style-type: none"> 1. Isolation of Pathogenic Fungi and Bacteria.

		Pathology		<ol style="list-style-type: none"> 2. Estimation of Rhizosphere, Phyllosphere, Spermosphere microorganisms by Serial dilution methods. 3. Screening of Botanical Pesticides (plant extracts) against Fungal Pathogens 4. Preparation of Plant Pathology Herbarium <p>Molecular Plant Pathology</p> <ol style="list-style-type: none"> 1. Isolation of Pathogenic Fungi and Bacteria. 2. Estimation of Rhizosphere, Phyllosphere, Spermosphere microorganisms by Serial dilution methods. 3. Screening of Botanical Pesticides (plant extracts) against Fungal Pathogens 4. Preparation of Plant Pathology Herbarium
	BOT-401	Molecular Genetics & Genomics and Proteomics	2019	<ol style="list-style-type: none"> 1. Genetic basis of inheritance of genes and their mapping in eukaryotes and microbes 2. Molecular marker techniques and construction of genetic and physical maps. 3. Whole genome sequencing strategies, and structural and functional annotation. 4. Principles and methods of Transcriptome and Proteome analysis. 5. Mechanisms of evolution of genomes, New genes and proteins and construction of Phylogenetic trees. 6. Structural organization of plant genomes, Arabidopsis and rice genomes and applications of genome projects.
	BOT-402	Plant Biotechnology	2019	<ol style="list-style-type: none"> 1. Techniques of Plant Tissue Culture and Applications. 2. Process of r-DNA technology 3. Production of genetically modified crops and Achievements

	BOT-403 IE	Molecular Plant Physiology	2019	<ol style="list-style-type: none"> 1. 1.Signal transduction pathways and Senescence 2. 2.Molecular mechanism of Photosynthesis 3. Synthesis and application of Nanomaterials. 4. Molecular Physiology of Stress and Flowering
	BOT-404 IE	Horticulture and Agricultural Biology	2019	<ol style="list-style-type: none"> 1. Propagation methods for horticultural crops 2. Soil science and fertility management for horticultural crops. 3. Seed production technology of horticultural crops.
	BOT-405 IE	Ethnobotany and Phytomedicine	2019	<ol style="list-style-type: none"> 1. Ethnobotanical knowledge 2. Medicinal plant Cultivation, Multiplication, Collection, Processing and Marketing 3. Sources of Plant Medicines, Formulations, Diagnostic features and their Biological activity.
	Practical – I	Molecular Genetics & Genomics and Proteomics; Plant Biotechnology	2019	<ol style="list-style-type: none"> 1) Isolation of genomic DNA and RNA and Quantification by Spectrophotometry. 2) Preparation of DNA denaturation curve 3) Restriction digestion of DNA, Agarose Gel Electrophoresis 4) PCR amplification of DNA. and RAPD analysis. 5) Precipitation of proteins ,Estimation of protein. 6) Determination of Isoelectric Point of proteins 7) Separation of proteins by SDS-PAGE and size determination 8) Problems related to genomics, proteomics and molecular evolution 9) Establishment of callus, organ and cell cultures
	Practical - II	Molecular Plant Physiology; Horticulture and Agricultural Biology; Ethnobotany and Phytomedicine	2019	<p>BOT-403 IE : Molecular Plant Physiology</p> <ol style="list-style-type: none"> 1. Extraction and Estimation of Chlorophyll pigments. 2. Assay of enzyme activity 3. Estimation of Carbohydrate, proteins and separation 4. Seed viability and germination 5. Metabolite accumulation under stress <p>BOT-404 IE: Horticulture and Agriculture Biology</p>

				<ol style="list-style-type: none"> 1. Isolation, Characterization and Identification of Rhizobium 2. Outdoor cultivation of Blue green Algae 3. Vermicompost production 4. Multiplication of VAM and Preparation Biofertilizers; 5. Establishment of nursery, different containers, soil transplantation techniques. 6. Plant propagation – layering, cutting, grafting. 7.. Layout and Designing of gardens and Lawns. <p>BOT-405 IE: Ethnobotany and Phytomedicine</p> <ol style="list-style-type: none"> 1. Recording medicinal practices and herbal formulations of tribal medicine by interviews and field study and preparation of report. 2. Development of medicinal plant nurseries in botanical garden. 3. Practical Methods of Cultivation, Propagation, Conservation and Protection of important Medicinal plants to develop familiarity. 4. Micro-propagation of Medicinal plants and Production of Callus from different Explants for Specific Biologically active Ingredients. 5. Practical demonstration of collection, processing and storage of Plant Medicines. 6. Demonstration of drug Formulation and Herbal cosmetics. 7. Organoleptic examination and physical and chemical properties.
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31. Biotechnology

	PROGRAMME	COURSE CODE	COURSE TITLE	Years of Introduction	Course Outcomes
1	M.Sc. Biotechnology	BTH 101	Structure and Functions of Biomolecules	2019	<ol style="list-style-type: none"> 1. Understand the classification of carbohydrates and their biochemical functions. 2. Correlate the reactions of amino acids that are basis for identification tests and biochemical pathways. 3. Know the structure of different classes of lipids and their roles in biological systems. 4. Comprehend the structure and functions of nucleic acids
		BTH 102	Advanced Tools and Techniques	2019	<ol style="list-style-type: none"> 1. Learn about various techniques for isolation and concentration of macromolecules. They will also understand the principles and applications of different Microscopes 2. Understand the techniques of chromatography, centrifugation and electrophoresis 3. Achieve a basic understanding of characterization of biomolecules by different Spectroscopic techniques 4. They learn safety measures in handling radioisotopes and familiarize with the various radioisotope tracer techniques and their role in biology.
		BTH 103P	Practicals related to Biochemical Preparations and Analysis & Analytical Methods	2019	<ol style="list-style-type: none"> 1. Acquire the skill to perform experiments related to Biochemical preparations and advanced tools and techniques
		BTH 104P	Practicals related to	2019	<ol style="list-style-type: none"> 1. Obtain the skill to perform experiments

			Microbiology and Immunology		related to Microbiology and Cell Biology
		BTH 105	Microbiology and Immunology	2019	<ol style="list-style-type: none"> 5. Acquire the knowledge on classification and structure of different microorganisms 6. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 3. Out line, compare and contrast the key mechanism of innate and adaptive immunity 4. Apply knowledge in disease diagnosis through serological tests
		BTH 106	Human values and Professional ethics-I	2019	<ol style="list-style-type: none"> 1. Learn the importance of Human values and Professional ethics
		BTH 201	Enzymes and Intermediary Metabolism	2019	<ol style="list-style-type: none"> 1. Gain knowledge on different enzymes and their significance 2. Correlate how the living organisms exchange energy and matter with the surroundings for their survival, and store free energy in the form of energy-rich compounds 3. Recognize how the catabolic breakdown of the substances is associated with release of free energy; whereas, free energy is utilized during synthesis of biomolecules i.e., anabolic pathways 4. Apply the knowledge of metabolic pathways to biotechnological and biochemical research.
		BTH 202	Molecular Biology	2019	<ol style="list-style-type: none"> 1. Understand the biochemical composition and genome organization in living cells 2. Learn about the mechanism of tissue specific transcription and role of RNA polymerases 3. Appreciate the correlation of genetic code with protein synthesis in prokaryotic and eukaryotic

					cells. 4. Gain insights of mechanism of gene expression and regulations
		BTH-203P	Practicals related to Enzymology & Molecular Biology	2019	Learn the skill to perform experiments related to Enzymology and Molecular Biology
		BTH-204P	Practicals related to Biostatistics and Bioinformatics	2019	Learn the skill to perform experiments related to Immunology and analyze data using various biostatistical methods.
		BTH 205	Research Methodology, Biostatistics and Bioinformatics	2019	<ol style="list-style-type: none"> 4. Discuss the various steps involved in conducting research 5. Learn to apply hypothesis testing via some of the statistical distributions 6. Develop understanding about Biological data and database search tools 7. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis
		BTH 206	Human values and Professional ethics-II	2019	Learn the importance of Human values and Professional ethics
		BTH 301	Genetic Engineering	2019	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes 2. Acquire knowledge on vectors for construction of genomic libraries and cDNA libraries 3. Understand the mechanism of cDNA synthesis 4. Know the techniques for transfer and expression of cloned gene and applications of genetic engineering in biological research.
		BTH-302	Cell and Tissue culture	2019	Gain the knowledge regarding plant and animal cell cultures. Get the skill to perform

					micropropagation.
		BTH 303P	Practicals related to Genetic Engineering, Cell and Tissue culture & Food and Industrial Biotechnology	2019	Learn the skill to perform the techniques for transfer and expression of cloned gene and applications of genetic engineering in biological research
		BTH 304 a.	Bioprocess Engineering and Technology	2019	<ol style="list-style-type: none"> 1. Handle the axenic cultures of industrially important microbes and appreciate the relevance of microorganisms from industrial context. 2. Gain an overview on design, operations and types of fermentation systems 3. Calculate yield and production rates in a biological production process, and also interpret data 4. Apply knowledge on separation and purification of end products of fermentation
		BTH 304 b.	Legal, Ethical and Implications of Biotechnology	2019	<ol style="list-style-type: none"> 1. Develop awareness on types IPR and patenting process 2. Understand legal and ethical controversies in biotechnological innovations 3. Apply knowledge in providing safety of food, water and environment 4. Gain overview of GM crops and microbes and their impact on environment
		BTH 304 c.	Food and Industrial Biotechnology	2019	<ol style="list-style-type: none"> 1. Acquire knowledge on food preservation, processing and control measures for food poisoning 2. Establish indoor and outdoor cultivation units for algal cultivation 3. Learn effective management of solid waste for

					energy production. 4. Appreciate the industrial role of microorganisms in production of biomolecules
		BTH 305 a	Plant Tissue Culture	2019	<ol style="list-style-type: none"> 1. Learn important milestones in the plant tissue culture and understand the concepts and principles of Plant tissue culture. 2. Learn different pathways of plant regeneration under in vitro conditions – organogenesis, somatic embryogenesis, synthetic seeds and applications. 3. Understand techniques of establishing cell suspension culture, techniques of virus elimination by meristem and shoot tip culture. 4. Acquire skill of propagation of elite medicinal and economically important plants and establish micropropagation unit for commercialization.
		BTH 305 b	Bioethics	2019	<ol style="list-style-type: none"> 1. Acquire the knowledge on IPR and procedures for patent filing 2. Understand the Legal and Ethical aspects of gene therapy - cloning - Manipulation of human genome -Technology transfer. 3. Learn role of Government, Industries and society in promoting, accepting and regulating the rDNA research 4. Develop understanding on Environmental and Health aspects of Biotechnology
		BTH 305 c	Bioinformatics	2019	<ol style="list-style-type: none"> 1. Develop understanding about Biological data and database search tools 2. Acquire hands on training on various computational tools and techniques employed

					<p>in Biological sequence analysis</p> <ol style="list-style-type: none"> Learn about pathway and enzyme databases, Sequence submission tools Develop understanding on protein folding and its significance
		BTH 401	Environmental Biotechnology	2019	<ol style="list-style-type: none"> Learn the relation between biotic and abiotic factors in different ecosystem models and predict how changes in free energy availability affect ecosystems. Appreciate the role of microorganisms in biodegradation and pollution detection Develop skill on large scale production and applications of bio pesticides and bio fertilizers fin agriculture Apply knowledge on solid waste management and reclamation of waste water
		BTH 402	Plant Biotechnology	2019	<ol style="list-style-type: none"> Develop skill in production of transgenic plants resistant to biotic and abiotic stress Apply knowledge for industrial production of plant metabolites Cultivate the micro and macro algae of commercial importance on large scale Identify different plant pathogens and apply biological control methods
		BTH 403	Project work	2019	<ol style="list-style-type: none"> Select the appropriate research design and develop appropriate research hypothesis for a research project and acquire hands on training on various tools and techniques employed in executing the project.
		BTH 404 a	Pharmaceutical Biotechnology	2019	<ol style="list-style-type: none"> Gain knowledge on preparation and formulations of different drugs

					<ol style="list-style-type: none"> 2. Develop skill on commercial production of pharmaceutical products for human welfare 3. Learn the techniques of drug validation and vaccine production 4. Understand the bioethical principle, values, concepts and social and judicial implications of pharmaceutical biotechnology
		BTH 404b	Animal Biotechnology	2019	<ol style="list-style-type: none"> Understand the organization of reproductive organs and advances in contraception research 2. Learn the techniques of In Vitro Fertilization and artificial insemination 3. Develop skill in molecular techniques for production of transgenic animals 4. Apply knowledge on molecular farming for production of vaccines and hormones
		BTH 404c	Applications of Biotechnology	2019	<ol style="list-style-type: none"> 1.Acquire the knowledge on applications of plant, animal and environmental biotechnology 2.Develop skill on organic farming and preparation of bio pesticides and bio fertilizers 3.Establish and maintain cell lines for vaccine production 4.Apply knowledge on waste management and recycling for environmental protection
		BTH 404d	Practicals Related to Environmental Biotechnology & Plant	2019	<ol style="list-style-type: none"> 1.Learn the techniques related to Environmental and Plant biotechnology
		BTH 405a	Tools in Biotechnology	2019	<ol style="list-style-type: none"> 1. Acquire the knowledge on analysis of DNA replication to map site specific points of replication 2. Learn to apply DNA microarrays to detect

					<p>replication origins</p> <p>3. Understand the functions of helicase and polymerase in DNA replication</p> <p>4. Acquire knowledge on sophisticated programmed of genome replication</p>
		BTH 405b	Immunology	2019	<p>1. Out line, compare and contrast the key mechanism of innate and adaptive immunity</p> <p>2. Apply knowledge in disease diagnosis through serological tests</p> <p>3. Develop skill in production of monoclonal antibodies</p> <p>4. Gain knowledge on undesirable immunological reactions and their complications in health management</p>
		BTH 405c	Applications of Biotechnology	2019	<p>1. Acquire the knowledge on applications of plant, animal and environmental biotechnology</p> <p>2. Develop skill on organic farming and preparation of bio pesticides and bio fertilizers</p> <p>3. Able to establish and maintain cell lines for vaccine production</p> <p>4. Apply knowledge on waste management and recycling for environmental protection</p>

32. Chemistry
Analytical Chemistry

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	CHE-101	Inorganic Chemistry I	2019	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes. 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules. 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions 4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.
2.	CHE-102	Organic Chemistry I	2019	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereo controlled reactions 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents. 3. To know the concept of isotope effects,

				<p>potential energy diagrams and transition states in different intermediates</p> <p>4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids</p>
3.	CHE-103	Physical Chemistry- I	2019	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics 2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories. 3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties. 4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification
4.	CHE-104	Inorganic Practical- I	2019	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations 2. To familiarize with techniques of titration and calculation of errors

5.	CHE-105	Organic Practical-I	2019	<ol style="list-style-type: none"> 1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups 2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules.
6.	CHE-106	Physical Practical I	2019	<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data
7.	CHE-107	General Chemistry-I	2019	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation. 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS.
8.	CHE-108	Human Values and Professional Ethics – I	2019	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts character and Conduct. 3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya 4. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics

9.	CHE - 201	Inorganic Chemistry II	2019	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reaction
10.	CHE-202	Organic Chemistry II	2019	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E₁, E₂ and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments. 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions. 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions. 4. To understand the structural elucidation and

				synthesis of alkaloids using specific reagents.
11.	CHE -203	Physical chemistry II	2019	<ol style="list-style-type: none"> 1. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems 2. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants. 3. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem. 4. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system
12.	CHE 204	Inorganic Chemistry	2019	<ol style="list-style-type: none"> 1. To separate and determine the two component mixtures. 2. To acquire knowledge in the preparation of metal complexes
13.	CHE 106	Core practical II: Organic Chemistry	2019	<ol style="list-style-type: none"> 1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the 2. To get knowledge about the chemical behavior of different components and mechanisms

14.	CHE 206	Core practical II: Physical Chemistry	2019	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsager equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry.
15.	CHE 207	General Chemistry II	2019	<ol style="list-style-type: none"> 1. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes 2. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
16.	CHE 208	Human Values and professional ethics-II	2019	<ol style="list-style-type: none"> 1. To understand the concepts of human values, responsibilities of family values and status of women in family and society 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 4. To familiarize environmental ethics, ethical theory and ecological crisis
17.	CHE-AC-301	Inorganic Spectroscopy and Thermal Methods of Analysis	2019	<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry.

				<ol style="list-style-type: none"> 2. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 3. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR. 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy
18.	CHE AC 303 & 304	Core-Practical: Classical Methods of Analysis	2019	<ol style="list-style-type: none"> 1. To know the basic principles of instrumental methods of analysis 2. To gain knowledge on chemistry of alloys 3. To Understand the complexity, theory and working principle of colourimetry 4. To familiarize with laws of colorimetric titrations
19.	CHE-AC-305A	Organic Chemistry III	2019	<ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents

				which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.
20.	CHE-AC-305B	Physical Chemistry III	2019	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle. 2. To learn the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy 4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
21.	CHE AC 306	Spectral Techniques	2019	<ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy. 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques. 3. To Understand the applications of AAS. 4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups

22.	CHE AC 306	Chromatographic Techniques	2019	<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques. 2. To familiarize applications of different chromatographic methods. 3. To Understand the principle of chromatographic techniques 4. To gain knowledge on the normal phase and reverse phase.
23.	CHE-AC-401	Quality Control and General Principles	2019	<ol style="list-style-type: none"> 1. To diagnose problems in the quality improvement process and Explain each total quality implementation phase 2. To know about theoretical basis for the use of organic reagents in inorganic analysis. 3. To understand different types of kinetic methods and their evaluation and to determine the kinetics of enzyme 4. To understand the oxidation reactions with Ce (IV) sulphate solutions and applications of complexometric titrations
24.	CHE-AC 402	: Instrumental Methods of Analysis	2019	<ol style="list-style-type: none"> 1. To understand the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF). 2. To understand the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC). 3. To get knowledge on instrumentation and

				<p>applications of GCMS in drug analysis and environmental samples analysis</p> <p>4. To improve the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I⁻ and S²⁻) by using I₂ liberations and Ce⁴⁺ liberation in solutions</p>
25.	CHE AC 403	Core practical I: Analytical Chemistry- Practical	2019	<ol style="list-style-type: none"> 1. Understand the common laboratory techniques including separation techniques 2. Polarography, atomic absorption spectroscopy in both emission and absorption mode. 3. Gain knowledge on implementation of gas chromatography and HPLC for separation of mixtures 4. Familiarize with interpretation of data to structures by NMR.
26.	CHE AC 404	Project Work	2019	<ol style="list-style-type: none"> 1. Perform experiments, collection and evaluation of data 2. Interpretation of results while adhering to scientific principles of responsible and ethical behaviour 3. Analysing and compiling the data and results in a chronological order in the form of dissertation. 4. Preparation of dissertation
27.	CHE-AC-405	Applied and Environmental Aspects	2019	<ol style="list-style-type: none"> 1. Have an idea about preparation of sampling, decomposition, separation and preconcentration of metal ions etc. 2. Gain experience on agrochemicals and fertilizers and their analysis

				<ol style="list-style-type: none"> 3. Have an idea on the analysis of fuels, alloys and explosives 4. Experience with environmental pollution monitoring techniques
28.	CHE-AC-406	Bioinorganic, Bioorganic, Biophysical Chemistry	2019	<ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes. 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters
29.	CHE AC 406A	Drug Chemistry	2019	<ol style="list-style-type: none"> 1. Know about natural products 2. Know Interpretation of cardiovascular drugs 3. Know the Analyzing about prostaglandins. 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.
30.	CHE AC 406 B	Electroanalytical Techniques	2019	<ol style="list-style-type: none"> 1. Know how to interpret potentiometry and conductometry 2. Know the Interpretation of results while adhering to DC Polarography 3. Know the Analysing and compiling the data and results in polarography . 4. Familiarize Types of ion sensitive electrodes

M.Sc., Environmental Chemistry

S.	Course Code	Title of the Course	Years of	Course Outcomes
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No.			Introduction	
1.	CHE-101	Inorganic Chemistry- I	2019	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes. 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules. 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions 4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.
	CHE-102	Organic Chemistry I	2019	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
		Physical Chemistry- I	2019	1. To know the concepts such as Operator algebra,

CHE-103				<p>Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics.</p> <ol style="list-style-type: none"> To learn about theories of reaction rates, Lindemann, Lindemann-Hinshelwood, and RRKM theories To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckel Equation and its Verification
CHE-104	Inorganic Practical- I		2019	<ol style="list-style-type: none"> To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations. To familiarize with techniques of titration and calculation of errors
CHE-105	Organic Practical-I		2019	<ol style="list-style-type: none"> To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
CHE-106	Physical Practical I		2019	<ol style="list-style-type: none"> To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different To calibrate the statistical data

CHE-107	General Chemistry-I	2019	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS
CHE-108	Human Values and Professional Ethics – I	2019	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts character and Conduct 3. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics
CHE-201	Inorganic Chemistry- II	2019	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions
CHE-202	Organic Chemistry -II	2019	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E_1, E_2 and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions

				<ol style="list-style-type: none"> To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions. To understand the structural elucidation and synthesis of alkaloids using specific reagents.
	CHE-203	Physical Chemistry- II	2019	<ol style="list-style-type: none"> To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system
	CHE-204	Inorganic Practical- II	2019	<ol style="list-style-type: none"> To separate and determine the two component mixtures To acquire knowledge in the preparation of metal complexes
	CHE-205	Organic Practical-II	2019	<ol style="list-style-type: none"> To familiarize with binary mixture separation and to gain hands-on-experience in purification of the To get knowledge about the chemical behavior of different components and mechanisms.

	CHE-206	Physical Practical -II	2019	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsagar equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry.
	CHE-207	General Chemistry-II	2019	<ol style="list-style-type: none"> 1. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and 2. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
	CHE-208	Human Values and Professional Ethics – II	2019	<ol style="list-style-type: none"> 1. To understand the concepts of human values, responsibilities of family values and status of women in family and society. 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 4. To familiarize environmental ethics, ethical theory and ecological crisis
	CHE-EC-301	Physical Chemistry III	2019	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle 2. To learn the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy

				4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
	CHE-EC-302	Spectroscopy Applications	2019	<ol style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE-EC-303	Water Analysis	2019	<ol style="list-style-type: none"> 1. To get an idea about water analysis 2. To understand the basic principles of soil analysis 3. To familiarize with instrumentation of potentiometric techniques 4. To gain knowledge on flame photometry and its applications
	CHE-EC-304	Instrumental Methods of Analysis-I	2019	<ol style="list-style-type: none"> 1. To get an idea about water analysis 2. To understand the basic principles of soil analysis 3. To familiarize with instrumentation of potentiometric techniques 4. To gain knowledge on flame photometry and its applications
	CHE-305	(a) Organic Chemistry III (b) Inorganic Spectroscopy & Thermal Methods of Analysis	2019	305 A <ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules.

		(c) Green Chemistry		<ol style="list-style-type: none"> 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds. <p>305 B</p> <ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry. 2. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 3. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy
	CHE-306	(a) Spectral Techniques or (b) Chromatographic Techniques	2019	<p>306 A</p> <ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques. 3. To Understand the applications of AAS. 4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups <p>306 B</p>

				<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques. 2. To familiarize applications of different chromatographic methods 3. To Understand the principle of chromatographic techniques 4. To gain knowledge on the normal phase and reverse phase
	CHE-EC-401	Water pollution Monitoring and Environment laws	2019	<ol style="list-style-type: none"> 1. Know about nuclear fission and fusion, uses of solar energy in space heating and water heating, hydropower and water heating, hydropower and production of ethanol from indirect solar energy. 2. Learn physical and chemical properties of water and water complexation in natural and waste water and to understand about global warming, ozone depletion, green house effect and acid rains. 3. Acquire knowledge on composition of inorganic and organic contaminants in soil, soil corrosion and industrial applications of green chemistry. 4. Get knowledge on various methods of solid waste collection and its disposal
	CHE-EC-402	Air pollution, control Methods-Noise and Thermal pollution	2019	<ol style="list-style-type: none"> 1. Acquire knowledge on disease causing agents in water 2. Learn about the removal of suspended and dissolved solids present in waste water 3. Understand different uses of micro-organisms in environmental protection 4. Know different world life acts such as forest conversion act, water control pollution act and air prevention and control act
	CHE-EC-403	Instrumental Methods of analysis-II	2019	<ol style="list-style-type: none"> 1. To know the basic principles of conductometry and analysis of acids and halides. 2. Colorometric estimation of iron and manganese. 3. To have an idea about working principles of IR, AAS,

				Spectrofluorimetry, Gas chromatography and HPLC. 4. To familiarize with interpretation of data
	CHE-EC-404	Project work	2019	<ol style="list-style-type: none"> 1. To identify research problem, propose the hypothesis and to collect literature. 2. To perform research designs & experiments 3. To tabulate research result. 4. To conclude research outcomes in the form of dissertation
	CHE-405	(a) Energy, Environment and Soils (b) Bioinorganic, Bioorganic & Biophysical (c) Chemistry of Nanomaterials & Functional materials	2019	<p>405 A</p> <ol style="list-style-type: none"> 1. Acquire knowledge on air pollutants, air pollution sampling measurements and analysis caused due to sulphur dioxide, carbon monoxide, nitrogen dioxide, oxidants, ozone, hydro carbons and particulate matter. 2. Learn about different control methods and adsorption of solids and liquids, gas analysis eluents viz., nitrogen oxides, carbon monoxide and hydrocarbons. 3. Understand pollution caused by vehicle emission, different industries, cement plants, steel mills and petroleum refineries. 4. Know about noise and thermal power project pollutions and their effect on human health. <p>405 B</p> <ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes. 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally. 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters

	CHE-406	(a) Drug Chemistry or (b) Electroanalytical Techniques	2019	<p>406 A</p> <ol style="list-style-type: none"> 1. Know about natural products. 2. Know Interpretation of cardiovascular drugs. 3. Know the Analyzing about prostaglandins. 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs <p>406 B</p> <ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry. 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes.
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M.Sc., Inorganic Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	CHE-101	Inorganic Chemistry- I	2019	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions 4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18

				electron rule.
	CHE-102	Organic Chemistry I	2019	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents. 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
	CHE-103	Physical Chemistry- I	2019	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics 2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories 3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties. 4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification
	CHE-104	Inorganic Practical- I	2019	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that

				<p>are supported by the observations.</p> <p>2. To familiarize with techniques of titration and calculation of errors</p>
	CHE-105	Organic Practical-I	2019	<p>1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups</p> <p>2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules</p>
	CHE-106	Physical Practical I	2019	<p>1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different</p> <p>2. To calibrate the statistical data</p>
	CHE-107	General Chemistry-I	2019	<p>1. To know about mean and median values, standard deviation and coefficient of variation.</p> <p>2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS</p>
	CHE-108	Human Values and Professional Ethics – I	2019	<p>1. To know about the needs and importance of professional ethics.</p> <p>2. To analyze nature of Values, basic Moral Concepts character and Conduct</p> <p>3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya.</p> <p>4. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics</p>

CHE-201	Inorganic Chemistry- II	2019	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams. 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods. 4. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods.
CHE-202	Organic Chemistry -II	2019	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E_1, E_2 and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments. 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions. 4. To understand the structural elucidation and synthesis of alkaloids using specific reagents
CHE-203	Physical Chemistry- II	2019	<ol style="list-style-type: none"> 1. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems. 2. To learn Gibbs adsorption isotherm, BET equation

				<p>and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants.</p> <p>3. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem.</p> <p>4. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system</p>
	CHE-204	Inorganic Practical- II	2019	<p>1. To separate and determine the two component mixtures.</p> <p>2. To acquire knowledge in the preparation of metal complexes</p>
	CHE-205	Organic Practical-II	2019	<p>1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the</p> <p>2. To get knowledge about the chemical behavior of different components and mechanisms</p>
	CHE-206	Physical Practical -II	2019	<p>1. To study the determination of cell constant and verification of Onsagar equation, strength of strong</p> <p>2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry</p>
	CHE-207	General Chemistry-II	2019	<p>5. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and</p> <p>6. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC</p>
	CHE-208	Human Values and Professional Ethics – II	2019	<p>1. To understand the concepts of human values, responsibilities of family values and status of women in family and society.</p>

				<ol style="list-style-type: none"> 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 4. To familiarize environmental ethics, ethical theory and ecological crisis
	CHE-IC-301	Inorganic Spectroscopy and Thermal Methods of Analysis	2019	<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry 2. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 3. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR. 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy
	CHE-IC-302	Organic Spectroscopy and Applications	2019	<ol style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE-IC-303 and CHE-IC-304	Core practical I & II Inorganic Chemistry	2019	<ol style="list-style-type: none"> 1. To know the basic principles of instrumental

				<p>methods of analysis.</p> <ol style="list-style-type: none"> 2. To familiarize with the analysis of organometallic complex salts. 3. To Understand the complexity, theory and working principle of colourimetry. 4. To gain knowledge on analysis of organic components
	CHE-305A	Organic Chemistry III	2019	<ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds
	CHE-305B	Physical Chemistry III	2019	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle 2. To learn the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals. 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches,

				<p>selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
	CHE IC 306 A	Spectral Techniques	2019	<ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy. 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques 3. To Understand the applications of AAS. 4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups
	CHE IC 306 B	Chromatographic Techniques	2019	<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques. 2. To familiarize applications of different chromatographic methods 3. To Understand the principle of chromatographic techniques. 4. To gain knowledge on the normal phase and reverse phase
	CHE-IC-401	Coordination compounds, Organo metallic chemistry & Chemistry of non-transition elements	2019	<ol style="list-style-type: none"> 1. To Gain an extensive knowledge about dinitrogen complexes of Ru(II), Os(II), Co(I), Mo(0) and dioxygen complexes of Ir(I) and Rh(I) and on cycloheptatriene and tropylium complexes of oxidative, reductive elimination reactions 2. To understand mechanism, stereochemical aspects and regeneration of catalyst in olefin hydrogenation (Wilkinson's catalyst), olefin oxygenation (Wacker process or Smidt reaction), Olefin hydroformylation and Fischer –Tropsch process.

				<ol style="list-style-type: none"> 3. To study the examples of metal complexes having metal-metal single or multiple bonds and analyse the spectroscopic evidences for the presence of metal-metal bond. 4. To understand the synthesis and structures of boranes, carboranes, borazines, silicates carbides, peroxy compounds and inter halogens, pseudohalides
	CHE-IC-402	Instrumental Methods of Analysis	2019	<ol style="list-style-type: none"> 1. To understand the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF). 2. To understand the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC). 3. To get knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis. 4. To improve the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I- and S²⁻) by using I₂ liberations and Ce⁴⁺ liberation in solutions
	CHE-IC-403	Instrumental Methods of Analysis-II	2019	<ol style="list-style-type: none"> 1. To understand the common laboratory techniques including separation techniques. 2. Polarography, atomic absorption spectroscopy in both emission and absorption mode. 3. To gain knowledge on implementation of gas chromatography and HPLC for separation of mixtures. 4. To Familiarize with interpretation of data to structures by NMR.

	CHE-IC-404	Project work	2019	<ol style="list-style-type: none"> 1. Ability to perform experiments, collection and evaluation of data 2. Interpretation of results while adhering to scientific principles of responsible and ethical behaviour. 3. Analysing and compiling the data and results in a chronological order in the form of dissertation 4. Preparation of dissertation.
	CHE-405	<p>(a) Solid state and Photo Chemistry</p> <p>(b) Bioinorganic, Bioorganic & Biophysical</p> <p>(c) Chemistry of Nanomaterials & Functional materials</p>	2019	<p>405 A</p> <ol style="list-style-type: none"> 1. To understand the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF). 2. To understand the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC). 3. To get knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis 4. To improve the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I^- and S^{2-}) by using I^2 liberations and Ce^{4+} liberation in solutions. <p>405 B</p> <ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron

				<p>transfer processes.</p> <ol style="list-style-type: none"> 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally. 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters
	CHE-406	(a) Drug Chemistry or (b) Electroanalytical Techniques	2019	<p>406 A</p> <ol style="list-style-type: none"> 1. Know about natural products. 2. Know Interpretation of cardiovascular drugs. 3. Know the Analyzing about prostaglandins. 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs. <p>406 B</p> <ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes

M.Sc., Organic Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	CHE-101	Inorganic Chemistry- I	2019	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes.

				<ol style="list-style-type: none"> 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules. 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions 4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule
	CHE-102	Organic Chemistry I	2019	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions. 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
	CHE-103	Physical Chemistry- I	2019	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics 2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories. 3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process,

				Gibbs- Duhem equation, calculation of thermodynamic properties. 4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification
	CHE-104	Inorganic Practical- I	2019	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations 2. To familiarize with techniques of titration and calculation of errors
	CHE-105	Organic Practical-I	2019	<ol style="list-style-type: none"> 1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups 2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
	CHE-106	Physical Practical I	2019	<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data
	CHE-107	General Chemistry-I	2019	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation. 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS.
	CHE-108	Human Values and Professional Ethics – I	2019	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts

				character and Conduct 3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya. 4. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics
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	CHE-201	Inorganic Chemistry- II	2019	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions
	CHE-202	Organic Chemistry -II	2019	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E_1, E_2 and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the

				<p>effect of electron donating and withdrawing substituents in selectivity of ring opening reactions.</p> <p>4. To understand the structural elucidation and synthesis of alkaloids using specific reagents.</p>
	CHE-203	Physical Chemistry- II	2019	<p>5. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems</p> <p>6. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants</p> <p>7. To identify Relation between order of a finite group and its subgroup, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem</p> <p>8. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system</p>
	CHE-204	Inorganic Practical- II	2019	<p>3. To separate and determine the two component mixtures</p> <p>4. To acquire knowledge in the preparation of metal complexes</p>
	CHE-205	Organic Practical-II	2019	<p>3. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the</p> <p>4. To get knowledge about the chemical behavior of different components and mechanisms.</p>
	CHE-206	Physical Practical -II	2019	<p>3. To study the determination of cell constant and verification of Onsager equation, strength of strong</p> <p>4. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry.</p>
	CHE-207	General Chemistry-II	2019	<p>3. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and</p>

				4. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
	CHE-208	Human Values and Professional Ethics – II	2019	<ul style="list-style-type: none"> 5. To understand the concepts of human values, responsibilities of family values and status of women in family and society. 6. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 7. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 8. To familiarize environmental ethics, ethical theory and ecological crisis
	CHE-OC-301	Organic Chemistry III	2019	<ul style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds
	CHE-OC-302	Organic Spectroscopy and Applications	2019	<ul style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of

				different molecules which are unique
	CHE OC 303 & 304	Core practical I: Organic Estimations - Practical	2019	<ol style="list-style-type: none"> 1. To gain knowledge about the estimation/percent purity of different organic molecules. 2. To get hands-on-experience with the synthesis and determination of concentrations and purity 3. To acquire knowledge in handling of toxic chemicals in multi step preparation of biologically important 4. To gain experience in the proposal of synthetic routes to functionalized derivatives
	CHE-OC- 305 A	Inorganic Spectroscopy and Thermal Methods of Analysis	2019	<ol style="list-style-type: none"> 1. To know the basic principles of instrumental methods of analysis. 2. To gain knowledge on chemistry of alloys. 3. To Understand the complexity, theory and working principle of colourimetry 4. To familiarize with laws of colorimetric titrations.
	CHE-OC- 305 B	Physical Chemistry III	2019	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_2V point group based on 3N Coordinates and to learn the Mutual exclusion Principle. 2. To learn the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals. 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy. 4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
	CHE OC 306 (A)	Spectral Techniques	2019	<ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques. 3. To Understand the applications of AAS. 4. To gain knowledge about Mass spectral fragmentation of

				organic compounds and common functional groups
	CHE OC 306 (B)	Chromatographic Techniques	2019	<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques 2. To familiarize applications of different chromatographic methods 3. To Understand the principle of chromatographic techniques. 4. To gain knowledge on the normal phase and reverse phase.
	CHE-OC- 401	Organic synthesis I	2019	<ol style="list-style-type: none"> 1. Familiarize with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents 2. Learn about photolytic reactions of carbonyl compounds, conjugated carbonyl derivatives, olefins, conjugated dienes CO₃:To gain knowledge in the determination of allowed or forbidden of chemical reactions viz., cycloaddition and 3. Learn the methods of preparation, properties, and industrial applications of various addition and condensation 4. Familiarize with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents
	CHE-OC 402	Organic Synthesis II	2019	<ol style="list-style-type: none"> 1. Familiarize with functionalization and interconversion of functional groups and the concept of organic synthesis by retrosynthetic approach 2. Gain knowledge in the formulation of synthetic routes for naturally occurring drugs. 3. Understand quinoline, acridine and guanidine group of alkaloids as antimalarials and to familiarize with the role of functioning of broad spectrum antibiotics. 4. Acquire knowledge about the classification, properties, structure & conformation and biological functions of peptides/proteins
	CHE OC 403	Core practical I: Spectral Identification of Organic Compounds	2019	<ol style="list-style-type: none"> 1. Calculate λ max values. 2. Ascertain functional groups.

				<ol style="list-style-type: none"> 3. Interpret the spectral data to the structure and stereochemistry of the molecules. 4. Analyse the fragmentation pattern of the molecules.
	CHE OC 404	Practical II: Project Work	2019	<ol style="list-style-type: none"> 1. Identify the problem, to collect the literature and understanding parameters to design the problem. 2. Perform experiments to synthesize the molecules with desired stereochemistry adopting modern techniques 3. Collect and interpretation of the data to the structures 4. Presentation of the data in the form of dissertation
	CHE-OC- 405A	Heterocycles and Natural Products	2019	<ol style="list-style-type: none"> 1. Familiarize with the synthetic routes of five membered heterocycles with two heteroatoms and to justify the site of 2. Acquire knowledge on the synthetic methodologies of benzofused and six membered heterocycles and the effect of 3. Familiarize with the structural elucidation and synthesis of naturally occurring steroids and hormones 4. Know about isolation, structural determination and synthesis of flavonoids and isoflavonoids
	CHE-OC- 405B	Bioinorganic, Bioorganic, Biophysical Chemistry	2019	<ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes. 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally. 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters
	CHE OC 406A	Drug Chemistry	2019	<ol style="list-style-type: none"> 1. Know about natural products 2. Know Interpretation of cardiovascular drugs. 3. Know the Analyzing about prostaglandins 4. Know the Definition, Classification, Nomenclature,

				Structure and Synthesis of anti-inflammatory drugs.
	CHE 406B	OC	Electroanalytical Techniques	2019
				<ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes

M.Sc., Physical Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CHE-101	INORGANIC CHEISTRY I	2019	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules. 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions. 4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.
2	CHE-102	Organic Chemistry I	2019	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions. 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types

				<p>of aromatic substitution reactions, their mechanism and the effect of substituents</p> <ol style="list-style-type: none"> 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
3	CHE 104	Core practical I: Inorganic Chemistry	2019	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations 2. To familiarize with techniques of titration and calculation of errors
4	CHE 105	Core practical I: Organic Chemistry	2019	<ol style="list-style-type: none"> 1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups 2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
5	CHE 106	Core practical I: Physical Chemistry	2019	<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data
6	CHE-107	General Chemistry I	2019	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS

7	CHE 108	Human Values and Professional Ethics-I	2019	<ol style="list-style-type: none">1. To know about the needs and importance of professional ethics.2. To analyze nature of Values, basic Moral Concepts character and Conduct3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya.4. To understand values of Bhagavd Gita, various –5. /*religions, religious tolerance, Gandhian ethic--
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	CHE - 201	Inorganic Chemistry II	2019	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions
	CHE-202	Organic Chemistry II	2019	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E₁, E₂ and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments. 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions. 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring

				<p>opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions.</p> <p>4. To understand the structural elucidation and synthesis of alkaloids using specific reagents</p>
	CHE -203	Physical chemistry II	2019	<ol style="list-style-type: none"> 1. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems 2. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants. 3. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem 4. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system
	CHE 204	Core practical I: Inorganic Chemistry	2019	<ol style="list-style-type: none"> 1. To separate and determine the two component mixtures. 2. To acquire knowledge in the preparation of metal complexes
	CHE 205	Core practical II: Organic Chemistry	2019	<ol style="list-style-type: none"> 1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the 2. To get knowledge about the chemical behavior of different components and mechanisms

	CHE 206	Core practical II: Physical Chemistry	2019	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsager equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pHmetry
	CHE-207	General Chemistry II	2019	<ol style="list-style-type: none"> 1. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and 2. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
	CHE 208	Human Values and professional ethics-II	2019	<ol style="list-style-type: none"> 1. To understand the concepts of human values, responsibilities of family values and status of women in family and society. 2. To acquire knowledge on different medical ethics the views of Charaka and Sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management 4. To familiarize environmental ethics, ethical theory and ecological crisis
	CHE-PC-301	Physical Chemistry III	2019	<ol style="list-style-type: none"> 1. To know the determination of Character Coordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle 2. To learn the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals 3. To study the rigid rotator model, Stark effect, vibration-rotation spectroscopy, PQR branches,

				<p>selection rules and Vibrational- rotational Raman spectroscopy</p> <p>4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
	CHE-PC 302	Organic Spectroscopy and Applications	2019	<ol style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds. 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE PC 303 & 304	Core practical I: Physical Chemistry-practicals I & II	2019	<ol style="list-style-type: none"> 1. To study chemical kinetics of homogeneous solutions 2. To gain knowledge on the determination of different cations by flame photometry 3. To understand the principle and working aspects of conductometric titrations 4. To acquire knowledge on the implementation of colorometric estimations 5. To study chemical kinetics of homogeneous solutions
	CHE PC 305 A	Organic Chemistry III	2019	<ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules

				<ol style="list-style-type: none"> 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.
	CHE-PC- 305 B	Inorganic Spectroscopy and Thermal Methods of Analysis	2019	<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry. 2. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR 3. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron
	CHE PC 306 A	Spectral Techniques	2019	<ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy. 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques. 3. To Understand the applications of AAS 4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups

	CHE PC 306 B	Chromatographic Techniques	2019	<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques. 2. To familiarize applications of different chromatographic methods. 3. To Understand the principle of chromatographic techniques 4. To gain knowledge on the normal phase and reverse phase
	CHE-PC- 401	Electrochemistry	2019	<ol style="list-style-type: none"> 1. Know the techniques of deposition of metals, throwing power simultaneous discharge of cations and methods of corrosion protection 2. Learn about electrochemical Batteries, fuel cells and nickel-cadmium batteries 3. Understand electrical double layer systems, sedimentation potential, null points of metals and zeta potential 4. Calculate electrochemical parameters; familiarize mixed ligand systems and reversible systems
	CHE-PC 402	Thermodynamics, Polymers and Solid-state Chemistry	2019	<ol style="list-style-type: none"> 1. Derive Gibbs Duhem equation and to calculate fugacity and chemical potential 2. Calculate excess free energy and entropy, to draw Hildebrand curves and to correlate excess functions and activity coefficients 3. Learn morphology, T_m and T_g points and to calculate transition temperatures and to identify cross linking in polymers 4. Identify magnetic properties of solids, magnetic materials, superconductors and BCS theory

	CHE PC 403	Core practical I: Inorganic Chemistry - Practical	2019	<ol style="list-style-type: none"> 1. To perform titration of mixture of halides and to draw potentiometry curves 2. To learn amperometric titrations and mixtures by polarography 3. To Correlation of data obtained from IR, AAS, HPLC and GC 4. To Determination of alkalinity and purity by pH metry
	CHE PC 404	Project Work	2019	<ol style="list-style-type: none"> 1. To identify research problems and to collect research literature 2. To propose hypothesis of a research problem 3. To perform research experiments 4. To analyse the data and conclude the research outcomes
	CHE-PC-405A	Chemical Kinetics	2019	<ol style="list-style-type: none"> 1. Draw skrabal pH diagram and to separate unimolecular and bimolecular reactions 2. Study laws of photochemistry, to derive stern-volmer equation <ol style="list-style-type: none"> 3. Identify chromo potentiometry points and to investigate kinetic currents and isotopic effects 4. Learn photochemical thresholds, chemiluminescence
	CHE-PC-405B	Bioinorganic, Bioorganic, Biophysical Chemistry	2019	<ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and

				biopolymer parameters
	CHE PC 406A	Drug Chemistry	2019	<ol style="list-style-type: none"> 1. Know about natural products. 2. Know Interpretation of cardiovascular drugs 3. Analyzing about prostaglandins. Know the 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs
	CHE PC 406 B	Electroanalytical Techniques	2019	<ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes

33. Environmental Sciences

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ENV-101	Ecology and Environment	2019	<ul style="list-style-type: none"> • Provide solutions to environmental problems using appropriate tools and techniques. • Develop both a quantitative and qualitative understanding of interactions between organisms and their consequences. • Gain the knowledge of functions of organisms and ecosystem.
2	ENV -102	Environmental Chemistry	2019	<ul style="list-style-type: none"> • Demonstrate knowledge of chemical and biochemical principles of fundamental environmental processes in air, water and soil. • Apply basic chemical concepts to analyze chemical processes involved in different

				<p>environmental problems.</p> <ul style="list-style-type: none"> • By knowing pollution levels in the environment best possible fresh environment can be created in different methods like afforestation, natural parks and sanctuaries etc., for human concern.
3	ENV-103P	Practical – I	2019	<ul style="list-style-type: none"> • Imparting practical knowledge about estimation of pH, Total Dissolved Solids, Hardness and Dissolved Oxygen, Chlorides and Sulphates in water samples.
4	ENV-104P	Practical-II	2019	<ul style="list-style-type: none"> • Understanding of various alkalinities present in the water sample by volumetric titration linked with theory. • By knowing water pollution potable water can be drawn out and wastewater can be treated. • By knowing various fertility of the soil can be known which is advantage to farmers for agriculture.
5	ENV-105	Environmental Toxicology and Public Health	2019	<ul style="list-style-type: none"> • To understand the role of toxicants in environment, methods used to quantify toxicity, regulations that govern toxic substances and assessment of risks posed by exposure to toxicants. • Inform, educate, and empower people about the potential hazards of toxic substances to environmental and human health. • By knowing the adverse health problems on human beings, safety, preventing measures can be implemented endemic and pandemic diseases can be controlled.
6.	ENV-106	Human Values and Professional Ethics-I	2019	<ul style="list-style-type: none"> • Describe the human values, understand the commitment and responsibility. • They gain the ability to bring harmony to the

				<p>society.</p> <ul style="list-style-type: none"> • By studying human values reformation of man and reformation of policy shall be done and harmony of environment and society also can be achieved.
7.	EN-201	Energy and Environment	2019	<ul style="list-style-type: none"> • Explain the key challenges and technologies in energy use, utilization of energy resources, energy conversion and environmental consequences. • They explain basic competence regarding environmental impacts arising from different energy carriers and technical solutions. • Enrichment of ecosystem will be achieved.
8.	ENV-202	Environmental Pollution	2019	<ul style="list-style-type: none"> • Analyze sources of pollution, exposure pathways, fate and evaluate consequences of human exposure to pollution and its impacts to environmental quality. • Distinguish the effect of pollutants on human health, economy and wild environments. • Pollution free environment for human life will be achieved.
9.	ENV-203P	Practical-I	2019	<ul style="list-style-type: none"> • Describe the amount of pesticide/insecticide in water/vegetable samples. • To find concentration levels of toxicant by use of instrumental techniques • To estimate physicochemical assessments in different water samples
10.	ENV-204P	Practical-II	2019	<ul style="list-style-type: none"> • Identify the concentration of biochemical by using instrumental methods. • To find an amount of LC50 of various metals in organism.

				<ul style="list-style-type: none"> • To estimate the growth rate of fauna at various habitat condensations.
11	ENV-205	Instrumental Techniques and Applications	2019	<ul style="list-style-type: none"> • Integrate a fundamental understanding of the underlining physics principles as they relate to specific instrumentation used for atomic, molecular, and mass spectrometry, magnetic resonance spectrometry and chromatography. • Environmental potentiality will be achieved. This is indirect benefits to the society. • To understand the analysis and level of concentration of different metals through instrumental techniques.
12	ENV-206	Human Values and Professional Ethics-II	2019	<ul style="list-style-type: none"> • Understand the core values that shape the ethical behaviour. • An ability to apply their broad education towards the understanding of the impact of engineering solutions in a global and societal context. • Making the students to full man, understanding the ethical values.
13	ENV -301	Waste Treatment and Management	2019	<ul style="list-style-type: none"> • Describe the components of solid waste management and the laws governing it. • Discuss the solid waste collection systems, route optimization techniques and processing of solid wastes. • Biodegradation of waste through natural and artificial methods will be achieved.
14	ENV -302	Environmental Assessment, Audit and Economics	2019	<ul style="list-style-type: none"> • Explain the concepts about the Environmental Impact Assessment (EIA) and describe the environment laws, aims and the necessity of EIA. • Critically examine assumptions inherent in impact assessment, examine a range of

				<p>environmental impact assessments and identify and explore impact assessment fields and approaches.</p> <ul style="list-style-type: none"> • Understand the sustainable development and controlling environmental pollution.
15	ENV -303	Practical-I	2019	<ul style="list-style-type: none"> • Understand the degradation of natural resources by constructions of various projects. • Understand requirement of oxygen for growth of organisms to break down organic matter in wastewaters. • Describe the low cost wastewater treatment practices in water demand areas.
16	ENV-304	Practical-II	2019	<ul style="list-style-type: none"> • It helps to explain the relationships between variables of the real-world applications. • Develop the programming techniques and the problem solving skills through programming.
19	ENV-305A	Ecotourism and Eco-restoration	2019	<ul style="list-style-type: none"> • Describe the challenging in Eco-Tourism and wildlife tourism. • Understand values of wildlife and minimizing impact on natural ecosystem due to tourism. • It is joyful to public and society; Government economy also will be generated.
18	ENV-305B	Biodiversity Conservation and Management	2019	<ul style="list-style-type: none"> • Systematically understand biodiversity and its vital role in ecosystem function. • Understand the value of biodiversity and current threats to biodiversity. • Describe Environment of nature
19	ENV-305C	Statistics, Computer Applications and Modeling	2019	<ul style="list-style-type: none"> • Analyze data using standard statistical techniques. • Utilize the Internet Web resources and evaluate on-line e-business system. • Environmental analysis, forecasting of the

				environment can be achieved.
20	ENV-306A	Natural Resources Conservation	2019	<ul style="list-style-type: none"> • Apply theories and methods with interdisciplinary approach towards natural resource management. • Critically examine the gap in the resource availability, use and conservation. • In conservation of the environment, employment can be generated.
21	ENV-306B	Environmental Education and Sustainability	2019	<ul style="list-style-type: none"> • Demonstrate an integrative approach to environmental issues with a focus on sustainability. • Communicate complex environmental information to both technical and non-technical audiences. • Students will be enriched about the nature.
22	ENV-401	Water Resources and Watershed Management	2019	<ul style="list-style-type: none"> • Understand water's importance as a precious resource. • Provide a basic understanding of the impact of water and water-related issues in a global, economic, environmental and societal context. • Describe the management of water resources through construction of watersheds for future generations.
23	ENV-402	Remote Sensing and GIS	2019	<ul style="list-style-type: none"> • Building a foundation for understanding Remote Sensing and Geographic Information System (RS-GIS) as a powerful tool for geospatial analysis. • Appreciate the application of RS-GIS techniques to the matrices of environment and Resource management. • Future predictions of the environment will be

				known about weather, cyclones and research etc.,
24	ENV-403	Practical-I	2019	<ul style="list-style-type: none"> Analyze the multi elements in various wastewater samples. Understand the rain water harvesting practices. Identify the water bodies and evaluate effective sensors and advance technique to extract and mapping the features for various applications.
25	ENV-404	Project Work and Comprehensive Viva-Voce	2019	<ul style="list-style-type: none"> Understand project characteristics and various stages of a project. Estimate and cost the human and physical resources required and make plans to obtain the necessary resources. It helps to develop in contextualization of knowledge, critical thinking and can lead to new innovation ideas.
26	ENV-405 A	Disaster Mitigation and Management	2019	<ul style="list-style-type: none"> Understand the mitigation approaches, their choices and alternatives. Develop foundations for hazard, risk and vulnerability assessment.
29	ENV-405 B	Environmental Laws, Policies and Legislation	2019	<ul style="list-style-type: none"> Understanding judicial response to environmental issues in India. Acquire the ability to evaluate the role of law and policy in conservation and management of natural resources and prevention of pollution.
28	ENV-405 C	Global Environmental Issues	2019	<ul style="list-style-type: none"> Predicting the consequences of human actions on the web of life, global economy and quality of human life. Developing critical thinking for shaping strategies (scientific, social, economic and

				<p>legal) for environmental protection and conservation of biodiversity, social equity and sustainable development.</p> <ul style="list-style-type: none"> • International issues will be understood.
29	ENV-406 A	Forest Resources and Management	2019	<ul style="list-style-type: none"> • Demonstrate knowledge of forest vegetation modeling and the ability to forecast its development over time using models of forest growth. • Integrate knowledge of basic biology, physical sciences, forest and wildlife ecology, and social sciences into the stewardship of forest resources. • Through forest management national economy will be improved.
30	ENV-406 B	Environmental Management and Sustainable Development	2019	<ul style="list-style-type: none"> • Ability to analyze environmental management in relation to the major principles of sustainable development. • The ability to work effectively to create environmental management analysis outputs of professional quality, both independently and within team environments.

34. Fishery Sciences & Aquaculture

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	AQC 101	Concepts of Aquatic Ecology	2019	<p>i. Understanding the General Characteristics, Principles of classification, Aquatic EcologyCommunities.</p> <p>ii. To understand the various Physical and chemical characteristics of water.</p>

2	AQC 102	Systematics And External Anatomy of Cultivable Organisms	2019	<p>i. Understand the concepts of finfish and shellfish systematics and anatomy.</p> <p>ii.</p> <p>iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations, Natural Selection and Genetic drift.</p> <p>iv. Understood the concepts of Micro, Macro evolution speciation categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.</p>
3	AQC 103 A	Fish Nutrition and Water Quality Management	2019	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. Understanding the comparative aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in taxonomy related research and job opportunities.</p> <p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p>
4	AQC: 103 B	Environmental Monitoring and Bio deterioration	2019	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine</p>

				<p>Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight into biological processes.</p> <p>iv. Understood that the four propositions underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
5	AQC- 104A	Coastal Aquaculture	2019	<p>i.The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p>
6.	AQC 104 B	: Ornamental Fish Culture	2019	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today</p>

				<p>life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
			2019	
7.	Practical-1 AQC 105	Identification and Morphology of Cultivable Organisms	2019	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the ultra-structural information of animal cell besides the detailed views of the cell interior revealing the various events and actions of cell at the molecular level.</p> <p>iii. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the</p>

				principles of Graft rejection, Auto immunity and Antibody based therapy.
8.	Practical-2 AQC106	Fish Nutrition	2019	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p> <p>ii. Students world gain expertise in understanding the complex molecular mechanisms occurring in cell and the applications of molecular technologies for betterment of life.</p> <p>iii. Understand and our apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the health Professions.</p>
9.	AQC 107	Human Values and Professional Ethics – I	2019	<p>i. Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they will also know the various tools and techniques related to bacterial microbiology.</p> <p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They</p>

				will know how to measure and stain different cell types.
10.	AQC 201	Principles of Aquaculture	2019	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fullest.</p> <p>iii. Learn the fundamental principles of immune response including molecular, biochemical and cellular basis of immune homeostasis.</p> <p>iv. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.</p>
11	AQC 202	Physiology of Cultivable Organisms	2019	<p>i. In depth understanding of Anatomical features of Integumentary, Circulatory, Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.</p> <p>ii. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>iii. An appropriate understanding of functioning of each system of different groups of animals with their comparison will be acquainted.</p> <p>iii. Understanding of the basic concepts of Physiological regulation, from cellular to organ</p>

				<p>to organismal.</p> <p>iv. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet.</p>
12	AQC 203A	Fresh Water Aquaculture	2019	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	AQC 203B	Capture fisheries	2019	<p>i. Students would gain expertise in explaining how a variety of interacting processes generate an organism's heterogenous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p> <p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity complex and coordinated systems in organisms the students can apply this knowledge for research, and education, to solve the problems related to development in animals through research.</p>
14	AQC 204 A	Fishery Economics, Extension and Environmental Management	2019	<p>i. Students will be able to apply the scientific method and quantitative techniques to describe,</p>

				<p>monitor and understand environmental systems.</p> <p>ii. Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.</p> <p>iii. Students will be able to be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p> <p>iv. Students will be able to use technology, such as geographical information systems and computer programming, to assist in problem solving.</p>
15	AQC 204 B	Limnology	2019	<p>i. Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>iv. Students would gain basic knowledge of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study and understanding of life processes.</p>

16	Practical-1 AQC205	Soil and Water Characteristics	2019	<p>i. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to Education, Research and Extension programmes in his further career.</p> <p>ii. Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>iii. Students learn about enzymes. Their classification and nomenclature</p> <p>iv. Students learn about specificity of enzymes</p> <p>v. Students learn about measurement of enzymatic activity</p> <p>vi. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.</p>
17	Practical-2 AQC206	Physiology of Fin Fish and Shell Fish	2019	<p>i. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>ii. Identify and describe the different equipment and tools used in a biology laboratory.</p> <p>iii. Correctly operate different laboratory instruments.</p> <p>iv. Correctly operate different types of microscopes.</p> <p>v. Prepare tissue for section cutting and correctly operate a microtome.</p>

18	AQC 206	Human Values and Professional Ethics – II (Audit course)	2019	<p>i. Students gain knowledge about regulation of enzyme activity with respective mechanisms</p> <p>ii. To understand about mechanism of enzymes in clinical diagnosis and their applications</p> <p>iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.</p>
19	AQC 301	Microbiology and Fish Pathology	2019	<p>i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology.</p> <p>ii. Describe different methods of data handling using computer.</p> <p>iii. Perform basic operations of gene sequence retrieval and compare them using different software.</p> <p>iv. Perform basic operations of protein structure retrieval and comparison using different software.</p> <p>v. The student will learn about the Computer basics like Operating systems, Programming, Data Access, Internet and Nucleic acid Sequence and Protein Data Banks.</p> <p>vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of dispersion like Mean deviation and Standard deviation and Co-efficient of Variation.</p> <p>v. The course will aid in learning Test of significance like Null hypothesis and Alternative hypothesis, t-test, F-test, Chi-square test, Correlation and Regression analysis.</p>
20	AQC 302	Fish Immunology	2019	<p>i. Creating the self-employment opportunities to</p>

				<p>rural students through Animal husbandry, Aquaculture, Vermiculture and Sericulture.</p> <p>ii. To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices.</p> <p>iii. Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.</p>
21	AQC: 303A	Cell Biology and Genetics	2019	<p>i. To understand the different pathogens causing disease in man.</p> <p>ii. Describe the different parasites causing disease and disability in man and animals.</p> <p>iii. Ability to elaborate about the life cycle and biology of disease carrying vectors; suggest preventive and control measures for the said diseases.</p> <p>iv. An understanding of the relationship between changes in physiology of host and</p> <p>v. The students after completion of the course based on the Expertise he/she may join as Parasitological Scientist.</p>
22	AQC 303 B	Bioinformatics In Aquaculture	2019	<p>i. Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment</p> <p>ii. Explain the importance of environmental audits and other management tools in business for social benefit by improving environmental performance</p> <p>iii. Calculate the carbon footprint of any organization and identify suitable mitigation</p>

				strategies for carbon reduction solutions.
23	Practical's AQC 304	Microbiology and Fish Diseases	2019	<ul style="list-style-type: none"> i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials ii. Students learnt and gain knowledge on structure and function of different types of Synapses iii. Gained information on different types of Neurotransmitters i.e. Amino acids and Peptides.
24	Skill oriented course AQC 305	Fish Nutrition Technology	2019	<ul style="list-style-type: none"> i. The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research. ii. Understanding of the physiological and genotoxic effects of drugs and environmental toxins. iii. To understand various types of insecticides and understand their mode of action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible with other control strategies. iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.
25	Open Elective (For other	a)AQC 306A: Fish Processing Technology	2019	<ul style="list-style-type: none"> i. Learnt about structure, function and organization of Neurons in the Central nervous

	department students)	b) AQC306B: Pollution and Toxicology		<p>system</p> <p>ii. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials.</p> <p>iii. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny.</p> <p>iv. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effectively communicate with both specialist and non-specialist audiences/community.</p>
26	AQC 401	Aquaculture Biotechnology	2019	<p>i. Skill development in environmental and occupational Toxicology.</p> <p>ii. It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain.</p> <p>iii. Identification of different routes of exposure of environmental toxins.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p> <p>v. To understand the overview of Animal Behavior and prominence of social organization in insects and primates.</p> <p>vi. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p>

				vii. To understand how to conserve the wild animals
27	AQC402	Essentials Of Biochemistry	2019	<p>i. Understanding of in vitro culturing of organisms and production of transgenic animals.</p> <p>ii. Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors.</p> <p>iii. This insight allows students to take into consideration about ethical issues involved in production of transgenic animals and BT products.</p> <p>iv. Use in gene transfer technology, genetic manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p> <p>v. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny</p> <p>vi. Classify the nutritional types of microorganisms and measure microbial growth</p> <p>vii. Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>viii. Assess impact of plant- microbe interaction on agriculture in both beneficial and detrimental ways. Identify industrially important microbes.</p>
28	AQC403A	Computer Applications, Information Technology And Biostatistics In Aquaculture	2019	<p>i. Understand the overview of Animal Behavior and prominence of social organization in insects and primates</p> <p>ii. Gained lot of information on different types</p>

	AQC403B	Aquaculture Engineering		<p>of Learning phenomenon and their mechanisms.</p> <p>iii. To understand the how to conserve wild animals and management strategies.</p> <p>iv. To gain the knowledge about wild animals and animal products importance.</p>
29	Practical's AQC 404	Biotechnology And Biochemical Estimations	2019	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic pathways.</p> <p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
30	Multidisciplinary course/ project work AQC405	Project Work / Fieldwork	2019	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p> <p>ii. Students will be able to perform basic genetic engineering experiments at the end of course.</p> <p>iii. Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.</p>
31	Open Elective (For other department students) AQC 406(A)	General Principles and Practices of Aquaculture	2019	<p>i. Understand the evolution of protein structural motifs and domains and associate this with function;</p> <p>ii. Use on-line structural databases and tools to predict the properties, structure and function of</p>

				<p>proteins.</p> <p>iii. Understand and explain enzyme mechanisms in a structural context.</p> <p>iv. Describe mechanisms of protein folding and the roles of natively unstructured proteins in biology.</p> <p>v. Understand how cross-talk between proteins and post-translational protein modifications (e.g. phosphorylation, ubiquitination) facilitate information processing in cells.</p>
32	AQC 406 (B)	Fish Breeding and Hatchery Management	2019	<p>i. To understand the basic concepts of Infectious diseases and the role of immunity to control infections</p> <p>ii. Provides knowledge on the physiological mechanisms leading to diseased conditions.</p> <p>iii. Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv. This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>

35. Geography

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	GEG-101	Geomorphology	2019	<ul style="list-style-type: none"> To understand the concept of place and how it is connected to people's sense of belonging to the physical environment, landscape and culture. To understand the fundamental concepts of spatial interaction and diffusion, which explain how human activities are influenced by the concept of distance. To exposed to the nature of physical systems such as geomorphologic processes and nat

				<p>ural hazards.</p> <ul style="list-style-type: none"> • To read and interpret information on different types of physical features maps. • To learn how human, physical and environmental components of the world interact.
2	GEG-102	Economic Resource Studies	2019	<ul style="list-style-type: none"> • To acquire knowledge about the concepts of resources, classification, models of natural resource processes, their use and misuse, conservation and management of resources for sustainable development • To Provide a comprehensive introduction to basic concepts and key theoretical approaches in economic geography • To Introduce economic geography as a dynamic, diverse and contested body of knowledge • To enable you to apply this knowledge to key social and economic issues in the context of economic globalization
3	GEG-103P	Maps Scales and Map Projections	2019	<ul style="list-style-type: none"> • To apprise the students about the art and science of mapmaking and representation. • To explain the usage of different types of projections • To focus on the importance of scale and projection in the process of representing the earth's surface
4	GEG-104P	Terrain Mapping Techniques	2019	<ul style="list-style-type: none"> • To apprise the students about the Terrain mapping techniques • To project the representation of the landforms by using contour lines • To explain the methods of slope analysis • To develop the knowledge on the thematic maps • To Understand the data representation through the diagrammatic form and log graphs
5	GEG-105	Advanced Cartography	2019	<ul style="list-style-type: none"> • To apprise the student to various aspects of cartography. • To introduce the basic concepts and key theoretical approaches in Advanced Cartography.

				To describes the art and science of map making and map analysis
6.	GEG-106	Human Values and Professional Ethics-I	2019	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society</p>
7.	GEG-201	Climatology and Oceanography	2019	<ul style="list-style-type: none"> • To introduce to the students the fundamentals of atmospheric phenomena, global climate systems and climate change. • The atmosphere and climate are a critical part of the earth system, and climatic variability and change are central to the issue of current and future global environmental change. • To grasp the techniques for modeling the climate, covering both the theoretical and technical aspects. • To understand the dynamics of the atmosphere and the overall climatological system. • To be able to analyse and interpret climatic data and classification of climate
8.	GEG-202	Principles of Remote Sensing	2019	<ul style="list-style-type: none"> <input type="checkbox"/> To focus on history and evolution of Remote sensing. <input type="checkbox"/> To explain the principle involved in remote sensing i.e. the Electromagnetic spectrum, reflection, refraction, diffusion, absorption and interaction with the earth's atmosphere. <input type="checkbox"/> To give the technical knowledge of satellite system. <input type="checkbox"/> To provide knowledge on the platforms and instruments used for remote sensing. <input type="checkbox"/> To give light on Areal Remote sensing and satellite Remote sensing. <p>To explain about the specifications of sensors</p>
9.	GEG-203P	Interpretation of topographical	2019	<ul style="list-style-type: none"> • To provide understanding and interpretation Skills of different Topographical maps. • To improve the knowledge on Indian weather maps and Interpretation skills.

		and Weather Maps		
10	GEG-204P	Techniques of Mapping and Map Analysis	2019	<ul style="list-style-type: none"> • To apprise the students about the Terrain mapping techniques • To project the representation of the landforms by using contour lines • To explain the methods of slope analysis • To develop the knowledge on the thematic maps
11	GEG-205	Geographical Thought	2019	<ul style="list-style-type: none"> • To acquaint the students with the Geographical philosophy and the Methodology and historical development of geography as a professional field. • The idea is to address the spirit and purpose of the changing geographies and to what we as geographers contribute towards knowledge production. • To developing critical thinking and analytical approaches and Students will acquire an understanding of and appreciation for the contributions of the eminent geographers to the subject.
12	GEG-206	Human Values and Professional Ethics-II	2019	<p>Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	GEG-301	Urban Studies	2019	<ul style="list-style-type: none"> • To deal with the concept of urban settlements and evolution of urban population and to provide concept of Urban studies. • To explain the cause and effects of growth in urban population.

				<ul style="list-style-type: none"> • To explain the theories involved in classifications of towns and relationship between towns and cities and their population. • To understand patterns of World urbanization with reference to India
14	GEG-302	Geographical Information System (G.I.S)	2019	<ul style="list-style-type: none"> • To understand the evolution of GIS. • To focus on collection, analyzing, interpretation and presenting the data related to Earth. • To explain the types of data collection with respect to time and terrain and Database management and retrieving the data from different sources. • To provide the theoretical knowledge on the Modeling surfaces and integration of Remote sensing with GIS. • To provide knowledge on GIS applications in different sectors.
15	GEG-303P	Geographical Information System (G.I.S)	2019	<ul style="list-style-type: none"> • To acquaint knowledge about especially Geographic Information System (GIS) softwares. • To develop the skill of geo-referencing and creation of different data files. • To improve the practical knowledge on attributed data and linkage. • To develop the skill on analysis methods of GIS.
16	GEG-304P	Statistical Techniques	2019	To analyze and represent the geographical data
17	GEG-305A	Agricultural Studies	2019	<ul style="list-style-type: none"> • To focus on evolution of Agriculture through at the different ages and approaches. • To understand the concepts and importance of determinants in different cropping patterns. <p>To understand agricultural allocation theories also the problem and prospects of Indian Agriculture</p>
18	GEG-305B	Regional Geography of	2019	<ul style="list-style-type: none"> <input type="checkbox"/> To develop the understanding about physical features of Indian Geography. <input type="checkbox"/> To familiarize the students with physiography, Drainage, Climate, soil and nature

		India with special reference to Andhra Pradesh		alvegetationofIndia.
19	GEG-305C	Disaster Management Studies	2019	<input type="checkbox"/> Todeveloptheskillofunderstandingaboutnaturalcalamitiesanddisasterandalsorealizetheconsequencesaswellaspreparedness. <input type="checkbox"/> Tocreateawarenessonhumanandnaturaldisasters <input type="checkbox"/> Tounderstandclassificationofdisastersanditsimpacts
20	GEG-306A	Regional Geography of Andhra Pradesh	2019	<ul style="list-style-type: none"> • Toacquaintthestudentwithre-organizationofAndhraPradeshanditsnewphysical,climateanddrainageaspects.. • Toobtaintheknowledgeofdemographic,irrigationandmajorcrops. • TounderstandAndhraPradeshmineralandindustrialaspectswithtransportation. • ToimproveknowledgeonthetransportationandcommunicationaspectsofAndhraPradesh
21	GEG-306B	Geographical information System(GIS)and Global Positioning System(GPS) applications	2019	<ul style="list-style-type: none"> • TodeveloptheskillofunderstandingGPSandSurvey. • TocreateawarenessonpostprocessingofGPSdataandcollectionofdatafromGPSsurvey. • Todevelopskillofreportwriting byusingGPSdataandsoftwareandhardwareToacquaintknowledgetheaboutespeciallyGeographicInformationSystem(GIS)softwares. • .Todeveloptheskillofgeo-referencingandcreationofdifferentdatafiles. • Toimprovethepracticalknowledgeonattributedataandlinkage. • TodeveloptheskillonanalysismethodsofGIS.

22	GEG-401	Regional Planning	2019	<ul style="list-style-type: none"> <input type="checkbox"/> To apprise the concept of Region and its planning. <input type="checkbox"/> To explain the types of regions and regional hierarchy. <input type="checkbox"/> To explain the types of regional planning and planning process. <input type="checkbox"/> To the people participation in planning process and role of Panchayat Raj system <input type="checkbox"/> To explain the resource based and physiographic based regional planning.
23	GEG-402	Advanced Remote Sensing	2019	<ul style="list-style-type: none"> • To give broad knowledge on photogrammetry, Principle, process, platforms and techniques and Aerial photographs. • To provide knowledge on software and hardware required for digital image processing, image enhancement and restoration techniques. • To understand the application of remote Sensing and Photogrammetry in various fields of study.
24	GEG-403P	Research Techniques	2019	<ul style="list-style-type: none"> • To provide an understanding for the student on statistical concepts to include measurements of location and dispersion, and correlation analysis. • To calculate and apply measures of location and measures of dispersion--grouped and ungrouped data cases. <p>To sensitize the different Research and agricultural techniques</p>
25	GEG-404P	Remote Sensing Applications	2019	<ul style="list-style-type: none"> <input type="checkbox"/> To explain practical knowledge on Remote sensing applications... <input type="checkbox"/> To help to understand Visual and digital interpretation of satellite Images. <input type="checkbox"/> To illustrate interpretation of Aerial photos. <p>To acquaint knowledge on allocation of RS in different fields and sectors</p>
26	GEG-405A	Water and Soil Resource Management	2019	<ul style="list-style-type: none"> • To apprise the student to various water resources related aspects and hydrological cycle. • To focus on groundwater and soils specifications. <p>To develop skill of water and soil management and to study on some case studies</p>
27	GEG-405B	Environmental	2019	<ul style="list-style-type: none"> • To create the environmental aptitude among students. • To familiarize the students with concepts, issues, approaches about physical

		Studies		land <ul style="list-style-type: none"> Toacquaintedwithcontemporaryenvironmentalproblemsandchallenges. To provide knowledge on Ecosystem, Biomes, food chain and hydrological cycle
28	GEG-405C	Geography for Research Extension and industry	2019	<ul style="list-style-type: none"> To explain the historical evolution, of research in Geographical studies. To help to understand about ethics, methods and factors in geographical research. To provide the knowledge about forms of research and design. To illustrate research methods and data collection. To acquaint research analysis and report writing
29	GEG-406A	Regional Geography of India	2019	<ul style="list-style-type: none"> To conceptualize the regional approaches and to examine regional differentiation in the study of Indian Geography. To expose to historical, economic, cultural, social and physical characteristics of India. To provide an introduction to the regions of the India in terms of both their uniqueness and similarities
30	GEG-406B	Remote sensing Principles and Applications	2019	<ul style="list-style-type: none"> To explain practical knowledge on Remote sensing applications... To help to understand Visual and digital interpretation of satellite Images. To illustrate interpretation of Aerial photos.

36. Geology

37. Home Science

Food Science Nutrition & Dietetics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	FSND 101	Food Chemistry and Analysis	2019	<ul style="list-style-type: none"> I. Acquire knowledge on chemical composition physical, chemical, and functional properties of Water, carbohydrate, Protein and Fats. II. Understand the principles and working applications of different analytical techniques associated with food. III. Perform skills in qualitative and quantitative estimation of nutrients in different foods. IV. This course gives an hands on experience which will help student to become food analyst at local, regional, national and global levels.
2	FSND 102	Food Science and Experimental	2019	<ul style="list-style-type: none"> I. Acquire knowledge on Plant and Animal foods composition, and processing techniques on nutritive quality of foods. II. Understand the principles of cookery of different foods and methods of evaluation. III. This course is prerequisite for skill development in Food Product development. IV. Standardization and experimentation on different foods leading to physical, chemical and sensory changes can be understood leading to become food research analyst in industries at local, regional, national levels.
3	FSND 103	Clinical Nutrition and Dietetics-I Foods	2019	<ul style="list-style-type: none"> I. Understand the concepts of nutrition and its relation to health. II. Describe the role and responsibilities of Dietitian in Hospital. III. Apply Knowledge related to Therapeutic modification of diets and Plan and prepare diet for different diseases conditions. IV. This will help the students to get placements in hospitals and also start their own diet and nutrition clinics.
5	FSND 107	Essential of Food and Community Nutrition	2019	<ul style="list-style-type: none"> I. Understand about nutrients in food, their functions and consequences of deficiency. II. Apply skills for planning diets for nutritional disorders like PEM, Iron, Vitamin A and Iodine. III. Develop the knowledge of techniques to assess the nutritional status of different age groups. IV. Acquire knowledge on government programs to prevent nutritional

				disorders according to regional and national needs.
6	FSND 104	Food Chemistry and Analysis Practical	2019	I. Develop skills in quantitative and qualitative analysis of food.
7	FSND 105	Food Science and Experimental Foods Practical	2019	I. Apply skills in standardization of foods using different processing techniques. II. Acquire skills in processing, preparation and evaluation of bakery products.
8	FSND 106	Clinical Nutrition and Dietetics-I Practical	2019	I. Acquire hands on experience in Therapeutic modifications of diet for different diseases by planning, preparing and evaluating. II. Acquire community assessment skills in terms of anthropometry, dietary, clinical and biochemical for various disorders and planning programs for important days. III. Apply Computational skills in the Nutritional allowances during life span.
9	FSND 107	Human Values and Professional Ethics-I	2019	I. Define the term ‘ethics’ , ‘good and bad values’, crime and punishment and religioustolerance. II. Understand the importance of good character, conduct and values embedded in various religions. III. Apply knowledge ofprofessional ethics and correlate the concepts in addressing the ethical issues outside the class room . IV. Demonstrate knowledge of ethical values in non-class room activities, internships and field work and resolve the moral issues. .
10	FSND 201	Nutritional Bio chemistry	2019	I. Understand the metabolism of nutrients such as carbohydrates, proteins, lipids, minerals and vitamins in human physiology. II. Acquire knowledge on factors affecting digestion, absorption of nutrients. III. Create awareness on enzymes and its role in nutrient metabolism. IV. Gain knowledge on role of vitamins and minerals as coenzymes in metabolism.
11	FSND 202	Food Microbiology and Safety	2019	I. Acquire knowledge about important genera of microorganisms associated with food. II. Acquaint with food contaminants and their sources. III. Understand the various factors associated with growth, food spoilage and

				<p>food-borne diseases of different microorganisms.</p> <p>IV. Gain knowledge on the characteristics of food borne diseases, infections and intoxications and their identification.</p>
12	FSND 203	Clinical Nutrition and Dietetics-II	2019	<p>I. Understand the concepts of dietary principles for various diseases.</p> <p>II. Comprehend knowledge in Dietary modifications for the management of diseases.</p> <p>III. Application of principals in preparation and service of diets to the patients.</p> <p>IV. Able to assess the case studies and construct the diet charts.</p>
13	FSND 204	Nutritional Bio chemistry Practical	2019	<p>I. Develop skill and hands on experience in analysis of biochemical parameters in blood and serum.</p>
14	FSND 205	Food Microbiology and Safety Practical	2019	<p>I. Demonstrate and develop skills in the use of standard methods and procedures for the microbiological analysis of food</p>
15	FSND 206	Clinical Nutrition and Dietetics-II Practical	2019	<p>I. Application of principals in preparation and service of diets to the patients.</p> <p>II. Able to assess the case studies and construct the diet charts.</p>
16	FSND 207	Research Methodology	2019	<p>I. Understand the concept of doing research about terms like ‘variables’, ‘hypotheses, and ‘research</p> <p>II. Gain knowledge on different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research.</p> <p>III. Critically gain knowledge to select a sample by using different sampling methods like probability and non-probability sampling.</p> <p>IV. Develop a research proposal in the appropriate scientific style.</p> <p>V. Critically apply knowledge of application of statistics in data analysis.</p> <p>VI. Apply skills in using computer applications for data analysis</p>
17	FSND 208	Human Values and Professional Ethics-II	2019	

18	FSND 301	Food Processing and Preservation Technology	2019	<ul style="list-style-type: none"> I. Understand the principles and scope of food processing and preservation. II. Get an overview on various techniques/methods in food processing and preservation. III. Acquire knowledge of emerging technologies and their applications in food processing and preservation. IV. Acquaint knowledge on advanced food preservation technologies.
19	FSND 302	Advances in Human Nutrition	2019	<ul style="list-style-type: none"> I. Appraise the advance concepts of nutrition of Brain, Immunity and Sports. II. Understand the concepts of dietary management in endemic nutrition problems. III. Create knowledge on the dietary management during emergencies. IV. Understand the process and relation of immunity and nutrition
20	FSND 303	Rural work experience	2019	This programme develops competency in the areas of technological, managerial and communication skills among the students. To develop communications skills in students using extension training methods through planning, preparing of Teaching Learning materials and providing education in the areas of Nutrition, Child development and transfer of technology.
21	FSND 304	Internship	2019	INTERNSHIP as dietitian in hospitals give practitioner skills for entry-level dietitians who are able to assume leadership roles to improve and maintain the nutritional care of diverse individuals, families and communities within national and global populations.
22	FSND 305-A	Nutrition Research techniques	2019	<ul style="list-style-type: none"> I. Understand the methods of nutritional status assessment. II. Knowledge on assessment techniques of protein quality in diets III. Comprehensive knowledge on research techniques using animal models. IV. Gain knowledge in nutrition research techniques using Human models.
23	FSND 305-B	Geriatric Nutrition	2019	<ul style="list-style-type: none"> I. Understand the physiological changes and theories of ageing. II. Knowledge on importance and consequences of diet in elderly. III. Awareness on degenerative diseases, life style genesis and its management through diet.

				IV. Describe the government programs and policies for elderly.
24	FSND 305-C	Nutrition in Emergencies And Disaster Management	2019	<ol style="list-style-type: none"> I. Understand and assess the emergency situations related to food and Nutrition in natural and manmade disasters. II. Acquire knowledge on nutrition surveillance and treatment in emergencies. III. Gain Knowledge on planning nutrition relief and rehabilitation in emergencies. IV. Develop skills in Nutritional epidemiological studies.
25	FSND30 6-A	Fundamentals of Food, Nutrition and Health	2019	<ol style="list-style-type: none"> I. Gain knowledge on foods, food groups, balanced diet for different age groups. II. Understand the importance of macro and micronutrients in daily diet. III. Comprehend knowledge on deficiency symptoms of different nutrients. IV. Develop skills and hands on experience to assess nutritional problems in community.
26	FSND30 6-B	Nutritional Assessment	2019	<ol style="list-style-type: none"> I. Learn the determinants of Nutritional Surveillance. II. Understand the direct and indirect methods of nutritional assessment. III. Knowledge on dietary assessment at individual and house hold level. IV. Identify the clinical symptoms and biochemical tests for different nutritional problems.
27	FSND 401	Food Safety Standards and Quality Control	2019	<ol style="list-style-type: none"> I. Understand the current food safety standards rules and regulations. II. Gain knowledge on desirable and undesirable constituents and contaminants in foods. III. Critical analysis on subjective and objective methods of quality of food. IV. Develop skills for quality analysis and assurance of food.
28	FSND 402	Food Product Development and Marketing	2019	<ol style="list-style-type: none"> I. Illustrate the new product categories in food market and their characteristics. II. Elucidate the process of new food product development in food industry. III. Exemplify various specialty food products and their applications. IV. Acquire the skill to design and development of new food product and analyze the quality of the product.
29	FSND 403	Nutrition for Health and Fitness	2019	<ol style="list-style-type: none"> I. Define the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation. II. Understand the Energy metabolism pathways during physical activity. III. Describe the role of macronutrients in physical performance, weight

				<p>management and obesity.</p> <p>IV. Explains the nutritional needs in different sports and the role of national agencies.</p>
30	FSND 404	Food Safety Standards and Product Development Practical's	2019	<p>I. Develop skills for quality analysis and assurance of food.</p> <p>II. Acquire the skill to design and development of new food product and analyze the quality of the product.</p>
31	FSND 405 A	Institutional Food Service Management	2019	<p>I. Understand the different types and management of food services.</p> <p>II. Illustrate the infra structure plans, menus and equipment in food service establishments.</p> <p>III. Know the food safety measures in food service establishments.</p> <p>IV. Knowledge on finance and personnel management.</p>
32	FSND 405 C	Technology of Packaging(T+P)	2019	<p>I. Provide knowledge on packaging and packaging materials</p> <p>II. An overview of the scientific and technical aspects of food packaging.</p> <p>III. Enable the students to understand the regulations of packaging and packaging material testing.</p> <p>IV. Apply skills of new innovations in food packaging to improve product stability and/or to extend the product shelf-life.</p>
33	FSND 406-A	Child Growth and Development	2019	<p>I. Know the terms growth, development and stages of development across life span</p> <p>II. Understand the characteristics of children at different stages of childhood</p> <p>III. Explain the different developments like physical, cognitive , language and social development during childhood.</p> <p>IV. Apply knowledge to understand normal development and developmental delays during childhood.</p>
34	FSND 406-B	Disaster Management	2019	<p>I. Know about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management.</p> <p>II. To understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters</p> <p>III. Explain the efforts made by the NGOs, Community based organizations and local administration in disaster management.</p> <p>IV. Discriminate disaster responses of Armed forces and Police.</p>

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Human Development and Child Welfare

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	HDCW-101	Advanced Study of Child Development	2017	Students acquire the knowledge of holistic development of individuals from conception to adolescent period. The students can disseminate the knowledge to teachers and parents regarding normal and delayed development among children. The students can apply skills when they serve as teachers at local level or as extension officers in national schemes like ICDS.
2.	HDCW-102	Community Nutrition	2017	Students acquire knowledge about food groups, RDA and steps in planning a diet. The skills learnt in planning and calculation of nutritive values help when they work in local hospitals or in National programs like Zero budget natural forming , ICDS etc.
3.	HDCW-103	Trends in Early Childhood Education	2017	Students apply knowledge about appropriate approaches to teach pre- school children. They apply skills in the field of early childhood education, when they are placed as pre -school teachers at local level and as pre- school trainers at national level in Government organizations like ICDS or NGOs like Azim Premji foundation, PRATHAM, Bachpan etc.
4.	HDCW-104	Practical-I Developmental Assessment Practical	2017	Students acquire skills on apply skills of observation of recording of all round development among infant and children below 5 years. They learnt how to assess cognitive, physical, social & emotional development of children from late childhood to adolescent period, and life skills among adolescents.. The students can apply skills when they as teachers at local level or as extension officers in national schemes like ICDS.
5.	HDCW-105	Practical-II Community Nutrition Practical	2017	Students apply skills related to food groups, RDA and steps in planning a diet. The skills learnt in planning and calculation of nutritive values help when they work in local hospitals or in National programs like Zero budget natural forming , ICDS etc.
6.	HDCW-106	Practical-III Early Childhood	2017	Students apply skills in the field of early childhood education, when they are placed as pre-school teachers at local level and as pre- school trainers at national level in

		Education Practical		Government organizations like ICDS or NGOs like Azim Premji foundation, PRATHAM, Bachpan etc.
7.	HDCW-107	Family Dynamics	2017	Students get knowledge related to issues in family and society and understand laws related to marriage and family . Students utilize this knowledge when they work in national organizations like social welfare board ,and family counseling centers and in non-government organizations catering to the family welfare at local level like PASS ,RASS etc..
8.	HDCW-108	Human Values and Professional Ethics-I	2017	Students understand the importance of good character , conduct and values embedded in various religions . Demonstrate knowledge of ethical values in non-class room activities, internships and field work.
9.	HDCW-201	Quality Standards in ECE Centers	2017	Students get knowledge about planning activities for pre-school children .They understand different ways of teaching stories ,rhymes etc using different audio-visual aids.apply skills in planning a day's activities for pre -school children , prepare Teaching Learning Material (TLM) and participate as student teacher in SVU Laboratory nursery school. The practical experience helps in establishing preschools, as entrepreneurs also to serve in Non Government institutions like Azim Premji Foundation, PRATHAM at national level and in Government sectors as extension officer at National level programs that are providing pre- school education
10.	HDCW -202	Child Study Techniques	2017	Students are capable to use standardized techniques for assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS ,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital.
11.	HDCW -203	Children with Developmental Challenges	2017	Students gain knowledge about the causes for various impairments and principles of assessment of children with disabilities and gifted children. The practical skills of management of special children were to be treated when they are placed as special educators in local schools ,colleges and at national Government organizations like NIMH,NIHH at national level and non government organizations at local level like Nava Jeevan center for Visually Challenged , RASS,PASS etc.
12.	HDCW-204	Practical-I Participation in ECE	2017	Students will be able to apply skills in planning a day's activities for pre -school children , prepare Teaching Learning Material (TLM) and participate as student

		Center Practical		teacher in SVU Laboratory nursery school. The practical experience helps in establishing preschools, as entrepreneurs also to serve in Non Government institutions like Azim Premji Foundation, PRATHAM at national level and in Government sectors as extension officer at National level programs that are providing pre- school education
13.	HDCW-205	Practical-II Child Study Techniques Practical	2017	Students apply skills for assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS ,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital
14.	HDCW-206	Practical-III Children with Developmental Challenges Practical	2017	Students are capable to use standardized techniques for assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS ,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital.
15.	HDCW-207	Research Methodology	2017	Student gain knowledge about types of research ,different methods of sampling and preparation of schedules/questionnaires. The students get skills in preparation of a research proposal. The knowledge helps the students to write articles for journals at national and international levels.
16.	HDCW -208	Human Values of Professional Ethics - II	2017	Understand the importance of value education and ethics in medical , business ,environmental and social fields. The students apply the knowledge while joining in any profession and will contribute to society as socially responsible citizens.
17.	HDCW -301	Parent Education	2017	The students gain knowledge about different child rearing practices and parenting styles adopted by parents. Gain skills in planning education materials for parents ,conduct parent education programs in schools and community, when they work as a teachers at local schools. It helps to disseminate the knowledge related to impact of parenting styles on child behavior to parents , teachers and significant others in the community.
18.	HDCW-302	Theories and Approaches to Child Guidance	2017	The students describe different theories related to child development and understand the reasons for maladaptive behavior. Apply the knowledge of theories to understand the behavior of individuals and also in counselling , when they join as counselors at local schools and mental health institutions at regional level like VIMHANS ,Vijayawada , at national level like NIMH ,Hyderabad and at local

				level Child Guidance clinics run by Government hospitals like SVRR hospital.
20.	HDCW-303	Practical -I Rural Work Experience	2017	Students develop an understanding of rural life situations and problems related to nutrition and child development relevant to real field situations through practical training. They gain knowledge and skills to impart education related to health and nutrition to the rural audience. This experience will helpful when they join rural development programs run by government like Health and Nutrition Natural Farming Fellow in Natural Farming Project.
21.	HDCW-304	Practical-II Internship	2017	Students get hands-on experience in real life work settings relevant to the human development like SODHANA, Vijayanagaram, Christian Counselling Centre ,Vellore ,Sudheesha Counselling Centre, Hyderabad, VIMHANS, Vijayawada.
22.	HDCW-305	Generic Elective* a) Infant Development and Stimulation b) Development of Learning Material and Children's Literature c) Planning For Project Management	2017 2018	(a)Students gain knowledge of stimulation activities for physical ,language ,cognitive and social development of infants. The knowledge and skills will help to plan stimulation activities for infants ,when they establish crèche as entrepreneurs or serve in Day care centers. (b) Students understand the importance and principles of teaching materials for young children. They gain skills in planning and development of material for al round development of children. The students can prepare teaching, learning materials when they join as teachers in pre - schools at local levels and as resource persons at national organizations like "Ajimpremi" Foundation. (c) Students gain knowledge in identification of problem for a research project, apply skills in selection of tools ,data collection and report writing .The knowledge helps the students to write articles for national and international levels and also to take up small projects.
24.	HDCW -401	Guidance and Counselling in Human Development	2017	The students gain the knowledge of different approaches to counselling. This will apply counselling skills to practice counselling process. The knowledge helps the students towards employment as counsellors in mental health institutions like VIMHANS ,Vijayawada and local non government organizations like RASS , PASS ,VIMHANS ,Vijayawada etc.
25.	HDCW -402	Advanced Human Development	2017	Students understand the characteristics and problems of early, middle and late adulthood persons. This knowledge helps when they get employment in Day care (or) foster care centers for elderly citizens (or) employment in Govt and ,local old

				age homes run by non govt organizations like RASS and PASS etc.
26.	HDCW -403	Rehabilitation and Management of Children with Special Needs	2017	Students understand the importance of Rehabilitation of children with developmental challenges through multi disciplinary approach. Gets practical knowledge about functioning of Govt and voluntary organizations that are managing children with developmental challenges .This helps students when they join as special educators at govt organizations like NIMH, Hyderabad and non govt organizations like RASS,PASS.
27.	HDCW-404	Practical Guidance and Counseling Practical	2017	The students gain the knowledge of different approaches to counselling. This will apply counselling skills to practice counselling process. The knowledge helps the students towards employment as counsellors in mental health institutions like VIMHANS ,Vijayawada and local non government organizations like RASS , PASS ,VIMHANS ,Vijayawada etc.
28.	HDCW-405	Generic Elective* (a) Child and Human Rights or (b) Organization and Management of Child Welfare of Institutions (c) Behavior problems and disorders among children	2017 2018	(a) Students gain knowledge about human rights ,child rights and women rights. They can explains issues faced by women and children in difficult circumstances . The knowledge helps to understand the rights and problems of women and children when they work in Government organizations like Child Protection Officers. (b).Students gain knowledge about the organizations striving for child welfare at national and international level. The knowledge helps when students join as supervisors in national schemes like ICDS and at regional level organization like RASS and PASS etc. (c)The students recognize the systems of common behavior problem and disorders among children. They apply skill in management of problems and disorders through behavior modification techniques .These skills help the students when they work at local NGO like RASS, PASS and regional level like VIMHANS Vijayawada
29.	HDCW-406	Open Elective* (For other departments) a) Child Welfare	2017	a). Students gain knowledge about the organizations striving for child welfare at national and international level. The knowledge helps when students join as

		Programs or (b)Disaster management		supervisors in national schemes like ICDS and at regional level organization like RASS and PASS etc. b).Students gain in-depth knowledge about natural disasters; manmade disasters; chemical hazards : disaster management. This helps to understand efforts made by the NGOs, Community based organizations and local administration in disaster management and also to help Government in times of disasters
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Extension Management and Communication Technology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	EMCT-101	Extension Education in Community Development	2019	The students can gain understanding on the Extension Management community development and panchayat raj system to study the community by using PRA and various approaches of extension education. The students will get jobs as extension officers, and various placements in community development projects, as well as rural co-operative sector.
2	EMCT-102	Community Nutrition	2019	The students know about nutrients in food and know about the nutritional deficiencies and the community level problems and policies and programmes of Nutrition.
3	EMCT-103	Communication and Media Preparation	2019	The concept of Communication –Recent trends in Instructional technology: Extension literature and the role of different factors influencing and effecting communication process- Dyad setting small group and mass communication. This course will help the students to improve their communication skills.
4	EMCT-104	Extension Education in	2019	The students will acquire skill to study the community by using PRA techniques and develop the skill of critical analysis on various approaches of extension education.

		Community Development Practical		
5	EMCT-105	Community Nutrition Practical	2019	Students gain practical knowledge on the role of nutrients in different stages of human life and methods of nutritional assessment and community level problems and policies.
6.	EMCT-106	Communication and Media Preparation Practical	2019	Students analyze the role of different factors influencing and effecting communication process, preparation and use of different teaching aids in teaching different groups of people and in different learning situations
7.	EMCT-107	Dynamics of Rural Society	2019	The students will gain knowledge on social structure; characteristics of rural people; rural social problems - social institutions, learn the factors affecting social change and gain insight about the welfare policies and programmes for rural society.
8.	EMCT-108	Human Values and Professional Ethics-1	2019	Students will apply knowledge of professional ethics and correlate the concepts in addressing the ethical issues outside the class room.
9.	EMCT-201	Entrepreneurial Development and Empowerment of Women	2019	Students acquire knowledge on Entrepreneurship, about the strategies for empowering women; rights of women and develop the entrepreneurship skills and learn about the institutional support of entrepreneurship. This course will help the students to become good entrepreneurs and also to start their own business enterprise.
10.	EMCT-202	Educational	2019	The students gain knowledge on concept of teaching learning process; forms and levels of teaching and learning; curriculum design, development knowledge on genesis and

		Technology		trends in modern education. This will help the students to develop the curriculum and to choose their career in the teaching field.
11	EMCT-203	Community organization and Leadership	2019	Students will know about community organization, process of Community organization, rural institutions, leadership, analyze different patterns of leadership; techniques of identification of leaders; steps to organize youth clubs; Role of Panchayat in developing rural women.
12	EMCT-204	Entrepreneurial Development and Empowerment of Women Practical	2019	Students will realize the role of entrepreneurship in economic development. Develop the skill of writing the business proposal and starting of business enterprise.
13	EMCT-205	Educational Technology Practical	2019	Students will develop the skill on developing a course curriculum; Preparation of lesson plans of selected topics and use of different instructional materials.
14	EMCT-206	Community Organization and Leadership Practical	2019	Students will develop the skill on different patterns of leadership, techniques of identification of leaders, and appraise the ongoing programmes in the locality.
15	EMCT-207	Research Methodology	2019	Students get knowledge on 'variables', 'hypothesis' ,research 'and recognize the purpose of doing a research, sampling methods and develop a research proposal in the appropriate scientific style.
16	EMCT-208	Human values and Professional	2019	Students gain knowledge on 'value education' 'self-introspection' and 'self-esteem develop well balanced personality, socially responsible persons of the society.

		Ethics-II		
17	EMCT-301	Rural Development Administration	2019	Students gain insight about administration in Extension and rural development: coordination and supervision in rural development administration, the purpose and principles of administration; human relation in extension administration the recent ongoing rural development programmes etc. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
18	EMCT-302	Training and Development	2019	Students will learn the concept of training, goals of training; learning and types of learning, factors affecting learning among adult, current trends in training methodologies; training strategies and designs and acquire skills in developing; selection and use of different training methods- case study; role play; and brain storming; etc. This course will help the students to get jobs as Trainee- motivators, Trainers, consultants etc.
19	EMCT-303	Rural Work Experience	2019	Students will develop an understanding of rural life situations prevailing in villages with special reference to Home science among the student will know about socioeconomic conditions of people and their problems and several agencies and institutions involved in rural development.
20	EMCT-304	Internship	2019	Students will gain first-hand exposure of working with NGOs. This will provide a practice-oriented and 'Hands-on' working experience in the NGOs / Government organizations and to enhance the students learning experience.
21	EMCT-305	(a) Managerial Skills for Extension Professionals (b) Communication	2019	a) Students will know about the conceptualization of management process and its major functions, managerial skill; nature and importance for extension professionals. To understand the concept; scope and relevance of media in society; functions and future prospects of media systems b) To understand the concept; scope and Communication technologies, relevance of

		Technologies in Extension c) Sustainable Livelihood Systems		media in society; functions and future prospects of media systems etc c) Students will know about the livelihoods of rural/urban people; resources – land, soil; climate; water and forests; processes and relationships among agro-climatic and natural resources, understand the production systems- farming and non-farming activities; their linkage with the livelihoods of rural people, food security; livelihood security, indicators of environmental sustainability.
22	EMCT-306	(a) Fundamentals of Food. Nutrition and Health (or) (b) Nutritional Assessment	2019	Students gain knowledge on foods, food groups, balanced diet for different age groups, understand the importance of macro and micronutrients in daily diet. Students will learn the determinants of nutritional surveillance; understand the direct and indirect methods of nutritional assessment. Gain knowledge on dietary assessment at individual and house hold level. Identify the clinical symptoms and biochemical tests for different nutritional problems
23	EMCT-401	Principles of Guidance and Counseling	2019	Develop knowledge about the concept; purpose; functions and role of guidance; types of services in a guidance programme , counseling and counseling theories, group guidance and counseling; concept; characteristics; Individual v/s group techniques. This course will help the students to get jobs as counselors and in Government and Non-government organizations, as counselors, consultant research co-coordinators etc
24	EMCT-402	Extension Programme Planning and	2019	Students will get knowledge about Programme planning in Extension; Programme Implementation; Programme Evaluation, Documentation, Programme Planning; the Preparation of plan of work ; Purpose, types and tools of Evaluation; Programme

		Evaluation		planning and implementation, documentation in Programme implementation. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
25	EMCT-403	Thesis/ Community Health Management	2019	Students gain knowledge about the concept of community health and global health; Primary Health Care – definitions; principles; components; comprehensive health care; levels of prevention, major health problems in India, management information systems in health, health needs of special groups – women, infants; and children; health of adolescents; geriatric health needs and problems.
26	EMCT-404	Principles of Guidance and Programme Planning Practical	2019	Assess the guidance programmes and counseling process in school and out of school settings and analyze use of standard test of study habits and attitudes (SSHA) for analyzing the study habits and attitudes.
27	EMCT-405	(a)Extension Management (b) Science & Technology for Rural Women (c) Environmental	2019	<p>a) Students will know about administration and management; process of management and organizational climate, understand the qualities and functions of extension personnel; Problems and issues of extension management in India. Analyze the management skills of extension personnel.</p> <p>b) Students will learn about the Science and Technology for rural development; Energy saving devices-application of solar energy; bio-gas etc., application of Science and Technology in Home science, safe water supply methods suitable for rural areas; health-hygiene and environmental sanitation, agencies involved in research and application of Science and Technology.</p> <p>c) Students will get the knowledge about the life and the environment; physical - chemical factors in the environment; changes in the environment; eco-system-earth, methods of waste management; women and environment government and non-</p>

		Management		governmental agencies in promoting better health, factors affecting changes in ecosystem and environment
28	EMCT-406	(a) Child Welfare Programmes or (b) Disaster Management	2019	a) Students will learn concepts of 'child' and 'child welfare', enlist children in need of care and difficult circumstances, understand the role of government, child welfare programmes developmental and rehabilitative manner to the disadvantaged people in the society, monitoring and evaluation b) Students will get an insight about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management., global warming etc)efforts made by the NGOs, & Community based organizations and local administration in disaster management.

Food Technology

S.	Course Code	Title of the Course	Years of	Course Outcomes
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No.			Introduction	
1	FT-101	Food Chemistry and Analysis	2019	<ul style="list-style-type: none"> - Students will acquire knowledge about physical, chemical, and functional properties of foods. - Learn the fundamental principles and working applications of different analytical techniques associated with food. - Students will be able to explore and perform skills in qualitative and quantitative estimation of nutrients in different foods.
2	FT-102	Food Science and Experimental Foods	2019	<ul style="list-style-type: none"> - Students will acquire knowledge on structure, composition and functional properties of plant and Animal foods. - Understand the principles of cookery of different foods and methods of evaluation. - Students will be able to apply the scientific method and quantitative techniques in standardisation of foods using different processing techniques.
3	FT-103	Cereal Grains, Legumes and Oilseed Technology	2019	<ul style="list-style-type: none"> - Students will gain knowledge on the structure and composition of cereal grains, pulses and oil seeds. - Understanding of the basic concepts of Post harvest technology, mechanism of equipments and processing of cereals, pulses and oilseeds - Know about various processing, milling process and evaluate Traditional and commercially processed foods with cereals, pulses and oilseeds

4	FT-104	Food Chemistry and Analysis	2019	<ul style="list-style-type: none"> - The students will know about principles and working applications of different analytical techniques associated with food. - Perform skills in qualitative and quantitative estimation of nutrients in different foods.
5	FT-105	Food Science and Experimental Foods	2019	<ul style="list-style-type: none"> - Comprehensive knowledge on techniques of analysing, evaluating and application of foods in different processing techniques in foods.
6.	FT-106	Cereal Grains, Legumes and Oilseed Technology	2019	<ul style="list-style-type: none"> - The students will be able to explore knowledge on various processing techniques of cereals, legumes and oilseeds. - Students acquire knowledge in various food applications and product preparations.
7.	FT-107	Essentials of Food and Community Nutrition	2019	<ul style="list-style-type: none"> - Students gain knowledge about nutrients in food and their functions. - Understand the nutritional problems of the community and consequences of deficiency of taking nutrients. - Apply skills for planning diets and techniques to assess the nutritional status of different age groups
8.	FT-108	Human Values and Professional Ethics - I	2019	<ul style="list-style-type: none"> - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. - Values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character

				<p>and conduct towards people of the society.</p> <ul style="list-style-type: none"> - Introducing different concepts of Bhagavad Gita and its applications in uplifting of values in the present society.
9.	FT-201	Technology of Horticulture produce	2019	<ul style="list-style-type: none"> - Attain an overview on the classification composition and post-harvest handling technologies of fruits and vegetables to reduce postharvest losses and their value addition. - Impart the knowledge of processing, preservation and manufacture of fruits and vegetable based food products of fruits and vegetables. - Expertise in development of various Fruits & vegetables based products and assess the quality of fruit and vegetables and their products.
10.	FT-202	Food Microbiology and Safety	2019	<ul style="list-style-type: none"> - Obtain knowledge about important genera of microorganisms associated with food and food spoilages. - Understand the various factors associated with growth, food spoilage and food-borne diseases of different microorganisms. - Demonstrate the use of standard methods and procedures for the microbiological analysis of food
11	FT-203	Dairy Technology	2019	<ul style="list-style-type: none"> - Impart the knowledge of milk grading , composition and technologies of processing of milk and milk products. - Provide in-depth knowledge in various unit operations and developments in dairy

				<p>processing.</p> <ul style="list-style-type: none"> - Demonstrate the manufacturing of various dairy products and exemplify the quality of dairy products.
12	FT-204	Technology of Horticulture produce	2019	<ul style="list-style-type: none"> - Student will know about various fruit and vegetable processing techniques and attain practical knowledge in production and preparation of products
13	FT-205	Food Microbiology and Safety	2019	<ul style="list-style-type: none"> - Acquire knowledge on laboratory techniques to identify microorganisms in food. - Demonstrate the various microbial estimations in foods by applying standard techniques.
14	FT-206	Dairy Technology	2019	<ul style="list-style-type: none"> - Students acquire knowledge of grading, composition, quality evaluation and processing techniques of milk and milk products.
15	FT-207	Research Methodology	2019	<ul style="list-style-type: none"> - Awareness about terms like ‘variables’, ‘hypothesis’, research ‘and recognize the purpose of doing research. - Understand different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research. - Critically apply knowledge to select a sample by using different sampling methods like probability and non-probability sampling and development of research proposal.
16	FT-208	Human Values and Professional Ethics – II	2019	<ul style="list-style-type: none"> - Student will know the values of ethics in various fields including medical, social and business ethics.

				<ul style="list-style-type: none"> - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. - Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
17	FT-301	Food processing and Preservation Technology	2019	<ul style="list-style-type: none"> - Students able to understand the scope, principles and different methods of processing and preservation techniques. - Acquire knowledge of emerging technologies and their applications in food processing and preservation. - Understand the applications and limitations of food processing and preservation technology.
18	FT-302	Live Stock and Sea Food technology	2019	<ul style="list-style-type: none"> - Acquire knowledge of the structure, composition, nutritional quality of various, livestock and seafood. - Gain insight knowledge of slaughtering, carcass processing, processing methods used for processing meat poultry and fish. - Prepare various value-added products of egg, meat, poultry and sea foods.
19	FT-303	Food Processing and Preservation Technology	2019	<ul style="list-style-type: none"> - Student acquires knowledge of emerging technologies and their applications in various processing techniques and products of various foods by processing and preservation methods.
20	FT-304	In plant training.	2019	<ul style="list-style-type: none"> - Provide hands on experience with regard to different areas in food industries. - Acquaint and gain knowledge related to production, unit operations, quality

				<p>control and marketing aspects of food industry.</p> <ul style="list-style-type: none"> - Emphasize the prominence of food plant sanitation, food safety, standards, laws and regulation in food industry.
21	FT-305(a)	(a)Unit operations in Food Industry.	2019	<ul style="list-style-type: none"> - Important preliminary operations in food processing industries and understand the principle of Unit operation in food industry. - Impart knowledge on Safety, sanitation and Effluent Treatment in food industry. - Know the different pre and post processing operations as storage and packaging foods etc.
22	FT-305(a)	(b) Spices, Condiments and Plantation Crops	2019	<ul style="list-style-type: none"> - Students acquire knowledge, identification and post-harvest technologies of various spices, condiments and plantation crops. - Illustrate various value added products of spices, condiments and plantation crops. - Perceive Standards, specifications, packaging and Quality control measures of spices, condiments and plantation crops.
23	FT-305(a)	(c) Nutrition in Emergencies and Disaster	2019	<ul style="list-style-type: none"> - Explain concepts on Epidemiology and its application in planning programs during emergencies and emergency situations in natural and manmade disasters. - Gain knowledge on nutrition surveillance and treatment in emergencies. - Knowledge on planning nutrition relief and rehabilitation in emergencies.
24	FT-306(a)	(a)Fundamentals of Food, Nutrition and	2019	<ul style="list-style-type: none"> - Gain knowledge on foods, food groups, balanced diet and importance of macro

		Health		<p>and micronutrients for different age groups in daily diet.</p> <ul style="list-style-type: none"> - Comprehend knowledge on deficiency symptoms of different nutrients. - Apply skills to assess on nutritional problems in community.
25	FT-306(b)	b)Nutritional Assessment	2019	<ul style="list-style-type: none"> - Understand the nutritional problems of the community and consequences of deficiency of taking nutrients. - Apply skills for planning diets and techniques to assess the nutritional status of different age groups.
26	FT-401	Food Safety Standards and Quality Control	2019	<ul style="list-style-type: none"> - Gain knowledge in current rules and regulations of food safety standards and quality assurance. - Understand the insight quality evaluation of different foods by standard methods. - Develop skills for quality analysis and assurance of food quality.
27	FT-402	Food Product Development and Marketing	2019	<ul style="list-style-type: none"> - Elucidate the process of new food product development process to generate ideas, develop concept to test market and in food industry. - Acquire the skill to design and development of new food product and analyse the quality of the product. - Student able to design, demonstrate the skills in food process, organoleptic evaluation and nutritional label of food products as a team work.
28	FT-403	Nutrition for Health and Fitness/Project Work	2019	<ul style="list-style-type: none"> - Understand the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation.

				<ul style="list-style-type: none"> - Describe the role of nutrients in physical performance, weight management, obesity and Energy metabolism pathways during physical activity. - Gain knowledge on concepts of physical activity, physical fitness and the importance of nutrients in Sports.
29	FT-404P	Food Safety standards and Product Development	2019	<ul style="list-style-type: none"> - Gain knowledge on subjective and objective evaluation methods of foods with safety and standards. - Exemplify various speciality food products and their applications, acquire the skill to design and development of new food product and analyse the quality of the product.
30	FT-405 (a)	(a) Institutional food service management	2019	<ul style="list-style-type: none"> - Gain knowledge on principles of safe food preparation and cooking methods and service management.
31	FT-405 (b)	(b)Basic Food Engineering	2019	<ul style="list-style-type: none"> - Student understands the basic Principles, overview of processing techniques and methods of food. - Able to describe the types and properties of agro processing equipments like pasteurizer, spray drier and sealing equipments. - Enumerate processing equipments and maintenance of processing equipments
32	FT-405 (c)	(c)Food Packaging	2019	<ul style="list-style-type: none"> - Enable the students to understand the regulations of packaging and packaging material testing. - Knowledge of the new innovations in food packaging to improve product stability and/or to extend the product

				shelf-life. - Able to utilize some of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life.
33	FT-406(a)	(a) Child Welfare Programmes	2019	- Understand the different developments like physical, cognitive, language and social development during childhood. - Apply knowledge to understand normal development and developmental delays during childhood.
34	FT-406(b)	(b)Disaster Management	2019	- Understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters;. - Illustrate the efforts made by the NGOs, Community based organizations and local administration in disaster management.

37. Mathematics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	MA 101	Algebra	2019	1. Identify the concept of action and conjugation. 2. Analyze the maximal, prime, nilpotent and Nil ideals. 3. Understand U.F.D.E.D and Polynomial Rings
2.	MA 102	Real Analysis	2019	1. Understand the concepts of Riemann Stieltjes integration and Differentiation. 2. Understand Uniform Convergence and continuity. 3. Learn comparison tests at a and infinity.

3.	MA 103	Ordinary Differential Equations	2019	<p>Course outcomes: From this course students will be able to</p> <ol style="list-style-type: none"> 1. Learn boundary value problems, Eigen values and Eigen functions 2. Solve the second order linear questions.
4.	MA 104	Complex Analysis	2019	<ol style="list-style-type: none"> 1. Decide when and where a given function is analytic . 2. Understand the Mobius Transformation. 3. Describe basic properties of complex integration and having the ability to compute such integrals. 4. Understand Power series and expansion of analytic
5.	MA 105	Computer Oriented Numerical Methods	2019	<ol style="list-style-type: none"> 1. Apply numerical methods to obtain approximate solutions to mathematical problems. 2. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and non linear equations, and the solution of differential equations. 3. Solve any numerical problem by using programming. <p>Develop interest in Numerical analysis to use finite precision computer arithmetic</p>

6.	MA 106	Human Values and Professional Ethics-I	2019	<ol style="list-style-type: none"> 1. Develop Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic virtue, Respect for others, Living Peacefully, Caring, Sharing, Honesty, Courage, Cooperation, Commitment, Empathy, Self Confidence character, Spirituality, Case study. 2. Understand human values . 3. Develop character, affection and love towards other human beings. 4. Know the value of Four Noble Truths of Buddhism
7.	MA 201	Galois Theory	2019	<ol style="list-style-type: none"> 1. Apply the knowledge on polynomials solvable by radicals, Extension field. 2. Understand the normal and separable extensions. 3. Study the roots of polynomials specially quintic polynomials which is the cause to develop Galois theory. <p>Solve the problems on cyclotomic polynomials</p>
8.	MA 202	Partial Differential Equations	2019	<ol style="list-style-type: none"> 1. solve Pfaffian differential equations and find orthogonal trajectories of a curve. <ol style="list-style-type: none"> 1. Analyze the origin of first order PDEs and Integral surfaces passing through a given curve 2. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method. 3. Apply various methods to solve Partial Differential Equations of the Second order. 4. Obtain equipotential surfaces using Laplace's

9.	MA 203	Topology	2019	<ol style="list-style-type: none"> 1. Understand to construct topological spaces from metric spaces and using general properties of neighborhoods, open sets, closed sets, basic and sub-basis. 2. Understand Topological Spaces, definition & examples. 3. Know the concepts connectedness, compactness, and Hausdorff property and their general characteristics. 4. Understand the Countability axioms, the separation axioms and normal spaces. And also the classical theorems such as the Uryshon lemma, the Tietze extension theorem.
10.	MA 204	Advanced Complex Analysis	2019	<ol style="list-style-type: none"> 1. To learn Laurent Series-Singular Points. 2. Explain the basic properties of complex integration and compute such integrals. 3. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions. 4. Understand the Infinite product and Partial Fraction Expansions.
11.	MA 205	Measure and Integration	2019	<ol style="list-style-type: none"> 1. Compute Lebesgue measures. 2. Compute Lebesgue integrals of bounded functions over a set of finite measure 3. Solving the Differentiation and Integration of Monotone functions. 4. Understand the L^p Spaces, the MinKowski and Holder inequalities, Convergence and completeness

12.	MA 206	Human Values and Professional Ethics-II	2019	<ol style="list-style-type: none"> 1. Understand the fundamental responsibilities and respect towards women 2. Know the value of education. 3. Question the illegal practices in the medical and business fields. 4. Understand the value of ecological balance and act in such a way which saves it. 5. Analyze the impact of media.
13.	MA 301	Commutative Algebra	2019	<p>To understand the ideals, Modules and operations on them.</p> <ol style="list-style-type: none"> 2.To learn the structures of composition series with ACC and DCC 2. To study the theoretical properties of Noetherian rings
14.	MA 302	Functional Analysis	2019	<ol style="list-style-type: none"> 1) Work with different distance metrics and normed spaces,understand continuous linear transformations and the Hahn-Banach Theorem. 2) Comprehend the Open mapping theorem and Closed graph theorem. 3) Construct orthonormal sets and conjugate spaces. 4) Understand the relevance of self-adjoint operators, normal, unitary operators and projections.

15.	MA 303	Classical Mechanics	2019	<ol style="list-style-type: none">1) Understand D' Alembert's Principle and simple applications of the Lagrangian Formulation.2) Derive the Lagrange's Equation from Hamilton's Principle.3) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems.4) Distinguish the concept of the Hamilton Equations of Motion and the Principle of Least Action.
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16.	MA 304	A) Differential Geometry B) Cryptography C) Linear Algebra D) Discrete Mathematics	2019	<ol style="list-style-type: none"> 1. Define space curves , curvature and torsion of a curve. 2. Parameterize surfaces and isometric correspondence. 3. Understand geodesic curves and conformal mapping. 4. calculate and analyse curvature of surfaces in different settings. <ol style="list-style-type: none"> 1) Understand various Cryptographic Techniques. 2) Apply various public key cryptography techniques. 3) Understand the various Security Applications. 4) Implement system level security applications. 5) Be familiar with secure random bit generator and linear feedback shift register sequences. 6) Know classical ciphers such as Vigenere Cipher and Hill Cipher. 7) Know of RSA, attacks on RSA, Diffie-Hellman key exchange and ElGamal, public key crptosystem. <p>Solve the system of linear equations</p> <ol style="list-style-type: none"> 2 .Understand the concept of vector space, basis, dimension and linear Transformation 3. Explain the direct sum decompositions 4. Understand the Bilinear forms. <ol style="list-style-type: none"> 1. Use standard Normal Forms-Disjunctive-Conjunctive Principal Disjunctive 2. Discuss Inference Theory of the Predicate Calculus
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17.	MA 305	A) Business Mathematics B) Basic Mathematics for social sciences	2019	<ol style="list-style-type: none"> 1. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems. 2. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and business. 3. Explain the concepts and use equations, formulae and mathematical expressions and relationships in a variety of contexts 4. Understand The Binary Octal , Octal, Decimal and Hexadecimal Systems. 5. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 6. Understand the concepts of Limit, continuity & differentiation of functions. 7. Apply Integrals to find areas, length & volume of regions. 8. Apply the numerical Techniques to solve differential equations & Algebraic equations.
18.	MA 401	Number Theory	2019	<p>.</p> <ol style="list-style-type: none"> 1. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 2. Understand the concepts of Limit, continuity & differentiation of functions. 3. Apply Integrals to find areas, length & volume of regions. 4. Apply the numerical Techniques to solve differential equations & Algebraic equations.

19.	MA 402	Banach Algebra	2019	<ol style="list-style-type: none"> 1. Understand different types of Banach Algebras with examples. 2. Know the essence of Gelfand mapping 3. Understand the Application of Commutative C*- algebras. 4. Derive the applications of Banach Algebra in analysis, Fourier series, Boolean Algebras and other significant areas of mathematics.
20.	MA 403	Graph Theory	2019	<ol style="list-style-type: none"> 1. Able to define basic concepts of graphs 2. Utilize the Algorithms to find the shortest path, Optimal tree from a given graph. 3. construct reliable communication network. 4. Understand the concepts of practical problems like Chinese postman problem and
21.	MA 404	A) Mathematical Statistics B) Approximation Theory C) Algebraic Coding Theory D) Operations Research	2019	<ol style="list-style-type: none"> 1. To learn the fundamental concepts of statistics and techniques required for data analysis. 2. Apply the knowledge of Binomial, Poisson, Gamma, chi-square, normal distribution in solving various problems,. 2. To explain stochastic convergence

22.	MA 405	A) Theoretical Computer science B) Biomechanics	2019	<ol style="list-style-type: none"> 1) Know the Basic concepts of Metric spaces And Normed Linear space. 2) Knows existence and uniqueness theorems for the best approximations in various Banach spaces. 3) Knows Bernstein's lethargy theorem and its practical and theoretical implications. 4) Be able to use and analyze the basic methods for polynomial approximations.
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APPLIED MATHEMATICS:

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
23.	AMA101	METHODS OF APPLIED MATHEMATICS	2019	<ol style="list-style-type: none"> 1. Expand a function in a Fourier series and able to know under what conditions such an expansion is valid. 2. Aware of the connection between integral transforms (Fourier and Laplace) and be able to use the latter to solve mathematical problems relevant to the physical sciences. 3. Understand the applications of Sylow theorems. 4. Describe Unique Factorization and Euclidean Domains.
24.	AMA 102	Real Analysis	2019	<ol style="list-style-type: none"> 5. Understand the concepts of Riemann Stieltjes integration and Differentiation. 6. Understand Uniform Convergence and continuity. 7. Learn comparison tests at a and infinity.

25.	AMA 103	Ordinary Differential Equations	2019	<p>Course outcomes: From this course students will be able to</p> <ol style="list-style-type: none"> 5. Learn boundary value problems, Eigen values and Eigen functions 6. Solve the second order linear questions.
26.	AMA 104	Complex Analysis	2019	<ol style="list-style-type: none"> 5. Decide when and where a given function is analytic . 6. Understand the Mobius Transformation. 7. Describe basic properties of complex integration and having the ability to compute such integrals. 8. Understand Power series and expansion of analytic
27.	AMA 105	Computer Oriented Numerical Methods	2019	<ol style="list-style-type: none"> 4. Apply numerical methods to obtain approximate solutions to mathematical problems. 5. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and non linear equations, and the solution of differential equations. 6. Solve any numerical problem by using programming. <p>Develop interest in Numerical analysis to use finite precision computer arithmetic</p>

28.	AMA 106	Human Values and Professional Ethics-I	2019	<ol style="list-style-type: none"> 5. Develop Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic virtue, Respect for others, Living Peacefully, Caring, Sharing, Honesty, Courage, Cooperation, Commitment, Empathy, Self Confidence character, Spirituality, Case study. 6. Understand human values . 7. Develop character, affection and love towards other human beings. 8. Know the value of Four Noble Truths of Buddhism
29.	AMA 202	Partial Differential Equations	2019	<ol style="list-style-type: none"> 1. solve Pfaffian differenrial equations and find orthogonal trajectories of a curve. <ol style="list-style-type: none"> 1. Analyze the origin of first order PDEs and Integral surfaces passing through a given curve 2. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method. 3. Apply various methods to solve Partial Differential Equations of the Second order. 4. Obtain equipotential surfaces using Laplace's

30.	AMA 203	Topology	2019	<ol style="list-style-type: none"> 5. Understand to construct topological spaces from metric spaces and using general properties of neighborhoods, open sets, closed sets, basic and sub-basis. 6. Understand Topological Spaces, definition & examples. 7. Know the concepts connectedness, compactness, and Hausdorff property and their general characteristics. 8. Understand the Countability axioms, the separation axioms and normal spaces. And also the classical theorems such as the Uryshon lemma, the Tietze extension theorem.
31.	AMA 204	Advanced Complex Analysis	2019	<ol style="list-style-type: none"> 5. To learn Laurent Series-Singular Points. 6. Explain the basic properties of complex integration and compute such integrals. 7. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions. 8. Understand the Infinite product and Partial Fraction Expansions.
32.	AMA 205	Measure and Integration	2019	<ol style="list-style-type: none"> 1. Compute Lebesgue measures. 2. Compute Lebesgue integrals of bounded functions over a set of finite measure 3. Solving the Differentiation and Integration of Monotone functions. 4. Understand the L^p Spaces, the MinKowski and Holder inequalities, Convergence and completeness

33.	AMA 206	Human Values and Professional Ethics-II	2019	<ul style="list-style-type: none"> 6. Understand the fundamental responsibilities and respect towards women 7. Know the value of education. 8. Question the illegal practices in the medical and business fields. 9. Understand the value of ecological balance and act in such a way which saves it. 10. Analyze the impact of media.
34.	AMA301	CONTINUUM MECHANICS	2019	<ul style="list-style-type: none"> 1) Be able to describe motion, deformation and forces in a continuum. 2) Be able to derive equations of motion and conservation laws for a continuum. 3) Understand constitutive models for fluids and viscoelastic solids. 4) Formulate and solve specific technical problems of displacement, strain and stress. 5) Perform experiments with stresses and deformations. 6) Numerically model and analyse the stresses and deformations of simple geometries under an arbitrary load in both solids and liquids.

35.	AMA 302	Functional Analysis	2019	<ul style="list-style-type: none"> 5) Work with different distance metrics and normed spaces, understand continuous linear transformations and the Hahn-Banach Theorem. 6) Comprehend the Open mapping theorem and Closed graph theorem. 7) Construct orthonormal sets and conjugate spaces. 8) Understand the relevance of self-adjoint operators, normal, unitary operators and projections.
36.	AMA 303	Classical Mechanics	2019	<ul style="list-style-type: none"> 5) Understand D' Alembert's Principle and simple applications of the Lagrangian Formulation. 6) Derive the Lagrange's Equation from Hamilton's Principle. 7) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems. 8) Distinguish the concept of the Hamilton Equations of Motion and the Principle of Least Action.

37.	AMA 304	A) Differential Geometry B) Cryptography C) Semi group theory D) Discrete Mathematics	2019	1. Define space curves , curvature and torsion of a curve. 2. Parameterize surfaces and isometric correspondence. 3. Understand geodesic curves and conformal mapping. 4. calculate and analyse curvature of surfaces in different settings. 8) Understand various Cryptographic Techniques. 9) Apply various public key cryptography techniques. 10) Understand the various Security Applications. 11) Implement system level security applications. 12) Be familiar with secure random bit generator and linear feedback shift register sequences. 13) Know classical ciphers such as Vigenere Cipher and Hill Cipher. 14) Know of RSA, attacks on RSA, Diffie-Hellman key exchange and ElGamal, public key crptosystem. 1. Define space curves , curvature and torsion of a curve. 2. Parameterize surfaces and isometric correspondence. 3. Understand geodesic curves and conformal mapping. 4. calculate and analyse curvature of surfaces in different settings. Solve the system of linear equations 2 .Understand the concept of vector space, basis, dimension and linear Transformation 3. Explain the direct sum decompositions
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38.	AMA 305	A) Business Mathematics B) Basic Mathematics for social sciences	2019	<ul style="list-style-type: none"> 9. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems. 10. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and business. 11. Explain the concepts and use equations, formulae and mathematical expressions and relationships in a variety of contexts 12. Understand The Binary Octal , Octal, Decimal and Hexadecimal Systems. 13. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 14. Understand the concepts of Limit, continuity & differentiation of functions. 15. Apply Integrals to find areas, length & volume of regions. 16. Apply the numerical Techniques to solve differential equations & Algebraic equations.
39.	AMA 401	Number Theory	2019	<ul style="list-style-type: none"> . 5. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 6. Understand the concepts of Limit, continuity & differentiation of functions. 7. Apply Integrals to find areas, length & volume of regions. 8. Apply the numerical Techniques to solve differential equations & Algebraic equations.

40.	AMA402	FLUID DYNAMICS	2019	<ol style="list-style-type: none"> 1) Be familiar with continuum model of fluid flow and classify fluid/flows based on physical properties of a fluid/flow along with Eulerian and Lagrangian descriptions of fluid motion. 2) Derive and solve equation of continuity, equations of motion, vorticity equation, equation of moving boundary surface, pressure equation and equation of impulsive action for a moving inviscid fluid. 3) Understand Boundary layer Equations. 4) Solve Analytic Boundary layer equations .
41.	AMA 403	Graph Theory	2019	<p>Able to define basic concepts of graphs</p> <ol style="list-style-type: none"> 2. Utilize the Algorithms to find the shortest path, Optimal tree from a given graph. 3. construct reliable communication network. 4. Understand the concepts of practical problems like Chinese postman problem and
42.	AMA 404	A) Mathematical Statistics B) Approximation Theory C) Algebraic Coding Theory D) Operations Research	2019	<p>To learn the fundamental concepts of statistics and techniques required for data analysis.</p> <ol style="list-style-type: none"> 2. Apply the knowledge of Binomial, Poisson, Gamma, chi-square, normal distribution in solving various problems,. 2. To explain stochastic convergence

43.	AMA 405	A) Theoretical Computer science B) Biomechanics	2019	<p>5) Know the Basic concepts of Metric spaces And Normed Linear space.</p> <p>6) Knows existence and uniqueness theorems for the best approximations in various Banach spaces.</p> <p>7) Knows Bernstein's lethargy theorem and its practical and theoretical implications.</p> <p>8) Be able to use and analyze the basic methods for polynomial approximations.</p>
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38. Microbiology

Course Code	Title of the Course	Years of Introduction	Course Outcomes
MB-102	Enzymology & Microbial Physiology & Metabolism	2019	<p>Be able to know about the nutrition and microbial growth. Be able to know about photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration.</p> <p>Be able to know in depth about various pathways in protein and nucleotide metabolisms</p>
MB-105	Introductory Microbiology	2019	<p>Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae</p>
MB-106	Human Values and Professional Ethics – I	2019	<p>Nature of Values- Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice, responsibility and freedom.</p> <p>Good behavior and respect for elders, Character and Conduct.</p>
MB-202	Medical Microbiology	2019	<p>Be able to explain about various infections.</p> <p>Be able to understand the diagnostic methods.</p> <p>Be able to explain the symptoms of bacterial infections.</p> <p>Be able to explain the symptoms of viral, fungal and parasitic diseases.</p>
MB-204P	Practical – II Medical Microbiology	2019	<p>Able performs various immune precipitations tests.</p> <p>Be able to perform various types of ELISA methods.</p> <p>Be able to gain practical knowledge about immunoglobulin's and there separation.</p> <p>Be able to perform widal, VDRL and types.</p> <p>Be able to perform various staining procedures.</p>

			Be able to identify blood cell types.
MB-205	Basics of Virology	2019	Explaining the biological and physical properties of viruses. Describing the differences between viruses vs. virion. Summarizing the different methods of viral study. Explaining tissue and cell culture. Discussing cloning genes and genomes, DNA sequencing and PCR. Listing analysis of components SDS treatment & electrophoresis for nucleic acids. Classifying plants viruses as: single stranded RNA (SS RNA), double stranded RNA (DS RNA); single stranded DNA (SS DNA) and double stranded DNA (DS DNA). Demonstrating knowledge about the genetic composition of plant viruses. Demonstrating knowledge of different viruses shape (rods, polyhedral and bullets). Describing the structure, replication and diseases caused by viruses in the families, Picornaviridae, Togaviridae, Flaviviridae, Calciviridae, Astoviridae, Coronaviridae, and Arteriviridae. Explaining the structure, replication and diseases caused by viruses in the families, Rhabdoviridae, Paramyxoviridae, Filoviridae, Orthomyxoviridae, and Bunyaviridae
MB-206	Human Values and Professional Ethics –II	2019	Medical ethics- Views of Charaka, Sushruta and Hippocrates on moral responsibility of medical practitioners. Code of ethics for medical and health care professionals. Euthanasia, Ethical obligation to animals, Ethical issues in relation to health care professionals and patients. Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions. Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.
MB 302	Recombinant DNA technology & Bioinformatics	2019	This course teaches rDNA technology techniques and their application in the field of genetic engineering. They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries. Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering
MB 305	b) food microbiology	2019	Through this course, they also learn about microbiology of milk, fermented dairy products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms.
MB-306	b) Industrial food Microbiology	2019	Students in this course will learn about microbes in food, spoilage of food and preservation techniques of food. Through this course, they also learn about microbiology of milk, fermented dairy products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms. At the end of the course, the student will be able to use the preservation techniques for food and use this experience to be employed as quality control experts
MB 405b	Bioprocess engineering	2019	After completing this course, the student will be able to define a bacterium, a fungus, a virus and archaea, give examples of structurally different microbes, and list microbes by their energy metabolism and carbon sources. The student will be able to evaluate the cultivation, enrichment and growth prevention methods for microbes. The student will be able to explain the roles of microbes in elemental cycles on Earth and, the waste decontamination methods based on microbial activities. He/she will be able to judge how microbes and enzymes could be applied in industry.
MB-406a	Fermentation technology	2019	The course aims to provide fundamental insights to exploit microbes for manufacturing of products which have huge industrial significance. The course blends science and engineering with various biochemical processes to obtain products such as food, chemicals, vaccines, medicine. At the end of the course, the student will have a better appreciation for the role of microbes in industry using technology Able to design procedures, record research methodology and interpret the research
MB-406b	Pharmaceutical Microbiology	2019	This course prepares the students in appreciating its benefits and applications in biotechnological, pharmaceutical, medical field.

39. INDUSTRIAL MICROBIOLOGY:

Course Code	Title of the Course	Years of Introduc	Course Outcomes
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IMB-102	Enzymology & Microbial Physiology & Metabolism	2019	Be able to know about the nutrition and microbial growth. Be able to know about photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration. Be able to know in depth about various pathways in protein and nucleotide metabolisms
IMB-105	Introductory Microbiology	2019	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
IMB-106	Human Values and Professional Ethics – I	2019	Nature of Values- Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice, responsibility and freedom. Good behavior and respect for elders, Character and Conduct.
IMB-202	Medical Microbiology	2019	Be able to explain about various infections. Be able to understand the diagnostic methods. Be able to explain the symptoms of bacterial infections. Be able to explain the symptoms of viral, fungal and parasitic diseases.
IMB-204P	Practical – II Medical Microbiology	2019	Able performs various immune precipitations tests. Be able to perform various types of ELISA methods. Be able to gain practical knowledge about immunoglobulin's and there separation. Be able to perform widal, VDRL and types. Be able to perform various staining procedures. Be able to identify blood cell types.
IMB-205	Basics of Virology	2019	Explaining the biological and physical properties of viruses. Describing the differences between viruses vs. virion. Summarizing the different methods of viral study. Explaining tissue and cell culture. Discussing cloning genes and genomes, DNA sequencing and PCR. Listing analysis of components SDS treatment & electrophoresis for nucleic acids. Classifying plants viruses as: single stranded RNA (SS RNA), double stranded RNA (DS RNA); single stranded DNA (SS DNA) and double stranded DNA (DS DNA). Demonstrating knowledge about the genetic composition of plant viruses. Demonstrating knowledge of different viruses shape (rods, polyhedral and bullets). Describing the structure, replication and diseases caused by viruses in the families, Picornaviridae, Togaviridae, Flaviviridae, Calciviridae, Astoviridae, Coronaviridae, and Arteriviridae. Explaining the structure, replication and diseases caused by viruses in the families, Rhabdoviridae, Paramyxoviridae, Filoviridae, Orthomyxoviridae, and Bunyaviridae
IMB-206	Human Values and Professional Ethics –II	2019	Medical ethics- Views of Charaka, Sushruta and Hippocrates on moral responsibility of medical practitioners. Code of ethics for medical and health care professionals. Euthanasia, Ethical obligation to animals, Ethical issues in relation to health care professionals and patients. Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions. Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.
IMB 305	b) Bioprocess Engineering and Technology	2019	Give elaborate knowledge on Health care products. Provide in depth knowledge about microbial antibodies and recombinant products. Provide detailed knowledge about organic acids and enzymes. Gives in depth knowledge on oxidative transformation.

IMB-306	a) Industrial Biotechnology	2019	Be able to gain knowledge on strain improvement. Be able understand the whole broth processing. Gain knowledge on production of industrial products
	b)Immuno Technology and Human Health	2019	Immunology and Human Health is designed to advance your understanding of the Immune system and to apply this knowledge to basic immunological research of human diseases. The immune system is composed of numerous cells and molecules that act in concert to maintain health, to overcome infection, prevent tumour growth and repair damaged tissues. The study of the immune system provides us with a fascinating insight into the relationship between animals, and the organisms that infect them (bacteria, viruses, protozoans and fungi). This subject provides a greater understanding of the complexity of the immune system and its responses to stresses such as infection. It demonstrates how modulation, or activation, of the immune system can either help overcome infection or may lead to autoimmune disease. Understanding the immune system gives us the potential to develop therapies to control events such as infection or autoimmune conditions. This subject helps students expand their understanding of current concepts in immunology and the potential application of applied immunology in medicine, research and industry.
IMB-404	Field Trip/ Industrial Tour Report / Dissertation	2019	Able to design procedures, record research methodology and interpret the research Able to design procedures, record research methodology and interpret the research
IMB-405	a) Biostatistics & Bioinformatics	2019	Be able to gain knowledge on basic concepts in statistics. Be able to design the experimental and statistical basics of biological assays. Be able to give familiarize with microbial genomes Be able to acquaint themselves with metagenomics Be able to learn basics of protein identification method Be able to gain knowledge on drug discovery
IMB-406	a) Microbes in Human Welfare	2019	Microbes are the major components of biological system on this earth. They are present everywhere, even at sites where no other life could possibly exist. Many microbes are useful to human beings. We use microbes and microbial derived products almost every day like curd and other fermented foods like idli, dosa, bread, etc. Microbes are also used in most of the industries. Alcohol, antibiotics, vinegar, etc are important microbial products. Microbes are very helpful in sewage treatment, biogas production and preparation of biofertilizers as well. So it's clear from this chapter that microbes play a very important role in welfare of human society.
	b) Medical and Diagnostic Microbiology	2019	Describe the aetiologies, epidemiology and basic mechanisms of pathogenesis of infectious diseases. Describe the basic principles of diagnosis, antimicrobial treatment, prevention and control of infectious diseases in the hospital and community. Describe the host immune system and explain the host response to infection Understand and interpret basic laboratory tests for the diagnosis of infectious diseases. Apply the principles of molecular and immunological techniques for the diagnosis of infectious diseases. Analyze and solve case studies involving bacterial and fungal agents

40. Physics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
	PHY 101	Classical Mechanics and Theory of Relativity	2019	<ol style="list-style-type: none"> 1. Formulate the Lagrangian and Hamiltonian mechanics concepts, solve the related problems 2. Learn the concepts of Poisson brackets, Hamilton-Jacobi equations and action angle variables. 3. Understand the Kepler's laws, Rutherford scattering, Euler's equations and solve the related problems 4. Learn the theory of relativity and its applications.
	PHY 102	Atomic and Molecular Physics	2019	<ol style="list-style-type: none"> 1. Understand the various basic concepts of atomic and molecular physics and know the analysis of different molecular spectra and then get the structural details. 2. Learn the concepts and importance of Zeeman effect, Stark effect and Paschen back effect 3. Understand the importance of rotational, vibrational and electronic spectra 4. Learn the various applications of atomic and molecular spectroscopy in different fields.
	PHY 103	Solid State Physics	2019	<ol style="list-style-type: none"> 1. Understand different bonds in solids, importance of lattice vibrations, their models and elastic properties 2. Explain electronic properties of solids in classical, quantum and the nearly free electron model. 3. Able to classify materials as metals, insulators and semiconductors and sketch the band diagram for each 4. Learn Hall effect and Heyness-Schockley experiment and their uses, properties, theories and applications of superconductors.

	PHY 104	Analog and Digital Electronics	2019	<ol style="list-style-type: none"> 1. Understand the design and working of BJT/FET/ MOSFETs based electronic circuits 2. Observe the effect of negative feedback on amplifier parameters, types of negative feedback topologies. Perceive the effect of positive feedback on working of Op-Amps based Oscillators. 3. Learn and understand the basics of digital electronics, Boolean algebra, and be able to design the simple logic circuits and test/verify the functionality of the logic circuits. 4. Develop the skill to build, and troubleshoot analog and digital electronic circuits.
	PHY 105	General Physics lab. - I	2019	<ol style="list-style-type: none"> 1. Determining the value of Planck's constant and Seebeck coefficient of a thermocouple, and also measurement and behavior analysis of semiconductor, laser, thermistor and white light dispersion. 2. Structural determination using X-ray diffraction method. 3. Learn the applications of lasers 4. Able to develop skills related to the said experiments in Physics.
	PHY 106	Electronics lab. - I	2019	<ol style="list-style-type: none"> 1. Identify relevant information to supplement the Analog Electronic Circuits. 2. Set up testing strategies and select proper instruments to evaluate the performance characteristics of the electronic circuit. 3. Able to learn the applications of operational amplifiers 4. Choose testing and experimental procedures on different types of electronic circuits and analyze their operation at different operating conditions.
	PHY 201	Statistical Mechanics	2019	<ol style="list-style-type: none"> 1. Learn different ensembles and partition functions and their applications to thermal properties of solids 2. Understand the concept of partition functions and its applications 3. Understand the concepts of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac distributions. 4. Disseminate the applications of Maxwell's distribution of velocities and various applications of systems behaving as ideal Bose gas or Fermi gas.

	PHY 202	Electromagnetic Theory, Lasers and Modern Optics	2019	<ol style="list-style-type: none"> 1. Understand the laws related to electrostatics and magnetostatics 2. Learn about light propagation in various materials and understand properties of lasers and applications 3. Know holographic concept, use of Fourier transforms in optics 4. Learn the basics and construction of optical fibre and optical fibre applications
	PHY 203	Mathematical Physics	2019	<ol style="list-style-type: none"> 1. Understand and apply the mathematical skills to solve quantitative problems in physics. 2. Apply Laplace and Fourier transforms in solving different problems of mechanics, electronics etc. 3. Solve different physical problems using numerical techniques 4. Understand complex variables and applications
	PHY 204	Nuclear Physics and Analytical Techniques	2019	<ol style="list-style-type: none"> 1. know the concepts of nuclear reactions and their usefulness in nuclear reactors. 2. Learn the classification of elementary particles and its properties 3. apply the various analytical techniques in getting structural details of unknown compounds 4. understand the various advanced spectroscopic techniques and microscopic techniques
	PHY 205	General Physics lab. - II	2019	<ol style="list-style-type: none"> 1. Using lasers in slit width calculation and refractive index measurement, 2. Understand phenomenon of interference through Young's modulus experiment 3. Intensity variation of light, photo transistor working, absorption and decay of nuclear radiation 4. Analyse the results and able to design the instruments

	PHY 206	Electronics lab. - II	2019	<ol style="list-style-type: none"> 1. Identify relevant information to supplement the Analog Electronic Circuits. 2. Choose testing and experimental procedures on different types of electronic circuits and analyze their operation at different operating conditions. 3. Under the architecture and working of 8085 microprocessor 4. Practice different types of wiring and instruments connections keeping in mind technical, Economical, safety issues.
	PHY 301	Quantum Mechanics – I	2019	<ol style="list-style-type: none"> 1. Solve problems in quantum mechanics using Schrodinger's equation and Dirac representation. 2. Grasp the concepts of different pictures and familiar with the applications 3. Know how the approximation methods applied to atomic, nuclear and solid-state physics. 4. Understand scattering theory, formulate and solve scattering equation- solve problems using this theory
	PHY 302	Physics of semiconductor devices	2019	<ol style="list-style-type: none"> 1. Classify different diodes and its importance in different applications 2. Gain theoretical knowledge on devices formation and able to fabricate devices

	PHY 303	Specialization: A) Applied Spectroscopy-I B) Condensed Matter Physics-I C) Electronics-embedded systems	2019	1.Understand the molecular structure and importance of various molecular transition 2.know the rotational, vibrational and Raman spectroscopy of molecules and their various applications 3.Understand the concepts and instrumentation in different spectroscopic techniques 4.Learn about fluorescence and phosphorescence spectroscopy and their applications. 1. Learn the classification of growth techniques and its importance, able to analyze the defects and its importance in properties of solids, gain knowledge on defects importance in growth of crystals 2. Explain various magnetic phenomena and describe the different types of magnetic ordering based on the exchange interaction, and magnons and their importance 3.Understand different dielectric properties, differentiate between ferroelectric, anti-ferroelectric, piezoelectric and pyroelectric materials. 4.Learn excitons, photoconductivity, types of luminescence, decay mechanisms 1. Acquire knowledge about PIC microcontrollers embedded processors and their applications. 2. Develop programs for data transfer, arithmetic, logical and I/O port operations. 3. Develop program for PIC microcontroller timers, serial port and Interrupts using “C”. 4. Interface LCD, keyboard, ADC, DAC, sensors, relays, DC and stepper motor with PIC microcontroller.
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	PHY 304	Elective: A) Photonics- I B) Solar Energy-Thermal Aspects C) Vacuum and Thin Film Technology	2019	<ol style="list-style-type: none"> 1. Understand the fundamental properties of lasers and laser systems 2. Know about the different optoelectronic devices and their behaviour 3. Aware of wide variety of applications of opto-electronic components. 4. Learn different modulations of light <ol style="list-style-type: none"> 1. Understand the fundamentals of solar energy, particularly the thermal energy component. 2. Acquire knowledge on solar radiation measurement techniques and procedures. 3. Demonstrate skills related collector performance analysis through hands on experience 4. Learn the working of different solar thermal energy systems <ol style="list-style-type: none"> 1. Learn production of vacuum and working of various pumps and gauges, design of vacuum system and detection of leak in system. 2. Basic concepts in preparing thin films, outline the conditions for deposition of amorphous, crystalline and epitaxial films. 3. Understand the thin film growth mechanism 4. Understand the working of thickness measurements instruments
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	PHY 305	Specialization-Lab.	2019	<ol style="list-style-type: none"> 1. Gain experience with some statistics to analyse data in laboratory. 2. Handle the spectrophotometers and could analyse the data. 3. Understand Zeeman effect practically <ol style="list-style-type: none"> 1. Identify the compounds based on qualitative analysis 1. Minority charge carrier current in calculation of band gap 2. Analysis of magnetic materials in terms of coercivity and saturation magnetization, 3. Creep importance in materials characteristics analysis 4. Transition temperature determination by finding dielectric constant, calculation of dispersion frequency of mono and diatomic lattices through electrical analog 1. Define the arithmetical and logical assembly language for microcontroller PIC 16F877A 2. Know the downloading procedure on hardware into flash ROM of PIC 16F877A 3. Show the testing data on a defined port wish board. 4. Competent to evaluate the data transfer response of PIC 16F877A.
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	PHY 306	Elective - Lab	2019	<ol style="list-style-type: none"> 1. Demonstrate both the theory and experiments related to propagation and modulation of light 2. Learn the optical fibre working 3. Design the Hologram 4. Propose and design new experiments based on the verification of theory with available optical components <ol style="list-style-type: none"> 1. Demonstrate the skills related to measurement of direct, diffuse and global solar radiation. 2. Understand the working of a solar cell and its efficiency measurement 3. Verify the influence of different parameters on the solar cell efficiency 4. Design a solar module for a specific output current and voltage ratings. <ol style="list-style-type: none"> 1. Understand the working of rotary and diffusion pumps 2. Band gap determination of semiconductor thinfilm 3. Working of solar cell 4. Demonstrate the skill acquired in connection with thin film and device characterization
	PHY 401	Quantum Mechanics - II	2019	<ol style="list-style-type: none"> 1. Learn distinguishability and indistinguishability of identical particles, construct symmetric and anti symmetric wave functions , students able to solve real problems 2. Grasp the concepts of spin and angular moment as well as their quantization and addition rules. Demonstrate angular momentum operators associated with spherical and symmetrical systems, able to obtain Clebsch –Gordon coefficients and learn its importance in atomic physics 3. Understand the principles of relativistic quantum mechanics and importance of Klein Gordon equation in solving real problems and know the concept of spin arising naturally from the Dirac equation 4. Learn different fields and its importance and gain knowledge about second quantization

	PHY 402	Advances in Physics	2019	<ol style="list-style-type: none"> 1. Understand the synthesis of nanomaterials, their application and impact on the environment. 2. Know the details of preparation and characterization of nanomaterials, micro and nanoscale devices. 3. Learn the basics of remote sensing, different payloads, sensors, satellite platforms. 4. Get the concept of image processing & interpretation and digital data transmission and storage.
	PHY 403	Specialization: A) Applied Spectroscopy-II B) Condensed Matter Physics-II C) Electronics-Wireless Communications	2019	<ol style="list-style-type: none"> 1. Have the knowledge on crystal field theory and the effect of weak crystal field on S, P, D and F terms. 2. Understand the importance of rare earth doped materials and able to evaluate various laser parameters. 3. Know the instrumentation techniques used in various spectrophotometers and uses of various detectors. 4. Acquire the knowledge on two photon spectroscopy. <ol style="list-style-type: none"> 1. Learn the relation between stress and strain and gain knowledge on elastic constants and velocity of elastic waves in different directions 2. Gain understanding on classical theory of specific heat and quantum theory of specific heat, able to understand Gruneisen parameter and lattice thermal conductivity 3. Know theories of different bands, Fermi construction and experimental determination of Fermi surface 4. Classify, know properties and applications of amorphous semiconductors, liquid crystals and polymers. <ol style="list-style-type: none"> 1. Understand and visualize the digital and optical modulation techniques. 2. Demonstrate the theoretical concepts in the laboratory. 3. Understand the importance of different communications 4. Fetch details in handling the fabrication, concepts of instrumentation and circuit design.

	PHY 404	Elective: A) Photonics - II B) Solar Energy- Photovoltaic Aspects C) Properties and Applications of Thin Films	2019	1. Understand the fundamental concepts of solar cells, manufacturing processes and limitations. 2. Acquire knowledge on cell efficiency study techniques and procedures for fault analysis. 3. Demonstrate skills related cell performance and fault analysis through hands on experience 4. Comprehend the applications of solar photovoltaic energy in day-to-day applications 1. Understand the fundamental concepts of solar cells, manufacturing processes and limitations. 2. Acquire knowledge on cell efficiency study techniques and procedures for fault analysis. 3. Demonstrate skills related cell performance and fault analysis through hands on experience 4. Comprehend the applications of solar photovoltaic energy in day-to-day applications 1. Measure and analyze the chemical composition and microstructure of thin films. 2. Understand the electrical transport mechanism and optical behavior of thin films. 3. Able to understand the optical properties of thinfilms 4. Learn the various general and technical applications of thin films in day-to-day life.
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	PHY 405	Specialization-Lab. – II / Project Work	2019	<ol style="list-style-type: none"> 1. Use standardized material to determine an unknown concentration. 2. Handle the spectrophotometers and could analyse the data. 3. Learn the applications of ESR 4. Acquire basic knowledge in the field of research. <ol style="list-style-type: none"> 1. Magnetic susceptibility determination, liquid crystal phases with temperature, 2. Working of temperature sensor, heat capacity calculation 3. Resistance variation and measurement in semiconductor with temperature 4. Able to analyze the materials and its behavior <ol style="list-style-type: none"> 1. Understand and visualize the digital and optical modulation techniques. 2. Demonstrate the theoretical concepts in the laboratory. 3. Gain hands on experience and will be able to envisage the concepts more clearly. 4. Know the fabrication process, concepts of instrumentation and circuit design.
	PHY 406	Elective – Lab. - II / Project Work	2019	<ol style="list-style-type: none"> 1. Get the experience on literature collection 2. Get the experience on selection of a problem independently related to recent work 3. Able to plan and execute the problem 4. Develop skills related to presentation of data, analysis discussion of the results and draw conclusions.

41. Psychology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	PSY 101	General Psychology-I	2019	<ul style="list-style-type: none"> • To understand the concepts and scope of psychology • To comprehend the biological basis of behavior • To study the perception and learning theories
2	PSY 102	Social Psychology	2019	<ul style="list-style-type: none"> • To understand the concepts of social psychology • To comprehend the social perception and cognition.

				<ul style="list-style-type: none"> • To study the socialization and attitudes
3	PSY 103	Psychopathology-I	2019	<ul style="list-style-type: none"> • To understand the abnormal behavior and historical and current trends • To comprehend the models of abnormal behaviour and approaches to therapies
4.	PSY 104	Psychological Measurements-I	2019	<ul style="list-style-type: none"> • To understand the psychological measurements • To comprehend the development of psychological tests and principles of test construction.
5	PSY 105P	Practical-I&II	2019	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
6.	PSY-106	Human Values and Professional Ethics-I	2019	
7.	PSY 201	General Psychology-II	2019	<ul style="list-style-type: none"> • To understand fundamentals of motivation and emotion • To understand basic concepts of memory and forgetting • To comprehend the thinking, intelligence and personality of individuals
8.	PSY 202	Applied Social Psychology	2019	<ul style="list-style-type: none"> • To understand the Social Influence, Social Exchange Process in social behaviour. • To comprehend the Prejudice and Discrimination and group and individuals.
9.	PSY 203	Psychopathology-II	2019	<ul style="list-style-type: none"> • To understand anxiety and mood disorders and somatic disorders. • To study Psychosis and Cognitive Disorders across life span
10.	PSY 204a	Psychological Measurements & Statistics	2019	<ul style="list-style-type: none"> • To understand the psychological measurements • To comprehend the development of psychological tests and principles of test construction.
	PSY 204b	Research Methodology	2019	<ul style="list-style-type: none"> • To get knowledge of psychological tests and their use

				<p>in diagnosis.</p> <ul style="list-style-type: none"> • To make students able to diagnose patients with the help of projective tests. • To get understanding of different diagnostic systems. • Learn how to take case history of patients. • To be able to make differential diagnosis.
	PSY 204c	Computer Applications in Psychological Research	2019	<ul style="list-style-type: none"> • To understand the basic components of computer and working in Ms Office, power point and internet services. • To comprehend the application of computer knowledge through creating emails, scientific journals and data scoring
11	PSY 205P	Practical - I & II	2019	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
12	PSY 206	Human values and Professional Ethics-II	2019	
13	PSY 301	Lifespan Developmental Psychology - Infancy to Adolescence	2019	<ul style="list-style-type: none"> • To understand the scope of life span development of infancy and babyhood • To comprehend the Early and Late Childhood and Adolescence.
14.	PSY 302	Personality	2019	<ul style="list-style-type: none"> • To introduce nature of personality. • To help determinants and development. To understand the Assessment of personality
15	PSY 303	Counseling Psychology-I	2019	<ul style="list-style-type: none"> • To understand the meaning of counseling and ethics in counseling • To comprehend the process of counseling and techniques
16	PSY 304a	School Psychology	2019	<ul style="list-style-type: none"> • To introduce nature of school psychology • To help children with emotional, social, and academic issues.

				<ul style="list-style-type: none"> • To collaborate with parents, teachers, and students to promote a healthy learning environment.
	PSY 304b	Organizational Behaviour and HRM	2019	<ul style="list-style-type: none"> • To understand organization and the Individual differences • To comprehend the motivation and leadership To study the decision making and organizational effectiveness.
	PSY 304c	Health Psychology	2019	<ul style="list-style-type: none"> • To understand the need of Health psychology and various models related to health and illness. To comprehend the health behaviour enhancement and management
	PSY 304d	Psychology of Disability	2019	<ul style="list-style-type: none"> • To understand historical development – Models of disabilities in the past and present scenario To comprehend Learning and behavioral disability, Needs and concerns of disabled in all groups
17	PSY 305P	Practical - I & II	2019	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
18	PSY 306	Personality Development (OE)	2019	<ul style="list-style-type: none"> • To study thebiological, psychological and socio cultural determinants &Soft Skills • To help determinants and development. • To understand the Assessment of personality
19	PSY 401	Lifespan Developmental Psychology – Adulthood and Later Maturity	2019	<ul style="list-style-type: none"> • To understand the scope of life span development of Adulthood and Later Maturity. • To comprehend the Adulthood and Later Maturity.
20	PSY 402	Theories of Personality	2019	<ul style="list-style-type: none"> • To introduce nature of personality. • To help determinants and development. • To understand the Assessment of personality
21	PSY 403	Counseling Psychology - II	2019	<ul style="list-style-type: none"> • To understand the meaning of counseling and ethics in counseling • To comprehend the process of counseling and

				techniques
22	PSY 404a	Psychology of Aging – Applied Aspects	2019	<ul style="list-style-type: none"> • To study and understand the aging from maturity to old age. • A form of discrimination against older adults based on their age. • To notice gerontology and issues
	PSY 404b	Consumer Behaviour and Marketing	2019	<ul style="list-style-type: none"> • To understand concept of consumer behaviour and market research • To comprehend the economic, social and psychological theory of buying motives. • To study the effect of advertising, sales promotion, branding and packaging
	PSY 404c	Rehabilitation Psychology	2019	<ul style="list-style-type: none"> • To understand historical development – Models of disabilities in the past and present scenario • To comprehend Learning and behavioral disability, Needs and concerns of disabled in all groups
23	PSY 405P	Practical I & II	2019	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
24	PSY 406	Life Skills (OE)	2019	<ul style="list-style-type: none"> • To learn the concept of life skills and its importance in relation to personality development of an individual. • To become aware of the components of life skills and the method of imparting knowledge of life skills.

COUNSELLING PSYCHOLOGY:

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	PSY 101	General Psychology-I	2019	<ol style="list-style-type: none"> 1. Understood the concepts and scope of psychology 2. Comprehended the biological basis of behavior 3. Studied the perception and sensation 4. Understood the concepts and learning theories
2.	PSY 102	Social Psychology	2019	<ol style="list-style-type: none"> 1. Understood the concepts of social psychology 2. Comprehended the social perception and cognition. 3. Studied the Socialization 4. Understood the meaning and theories attitudes
3.	PSY 103	Psychopathology-I	2019	<ol style="list-style-type: none"> 1. Understood the meaning abnormal behavior and historical and current trends 2. Comprehended the models of abnormal behaviour and approaches to therapies 3. Learned about classification and assessment of abnormal behaviour 4. Able to evaluate different approaches to therapies for abnormal behaviour
4.	PSY 104	Psychological Measurements-I	2019	<ol style="list-style-type: none"> 1. Understood the assessment and psychological measurements 2. Comprehended the development of psychological tests and principles of test construction. 3. Learned the Principles of Test Construction 4. Understood the test Development and test Standardization Procedures
5.	PSY 201	General Psychology-II	2019	<ol style="list-style-type: none"> 1.The students understood the fundamentals of motivation and emotion 2. They understood the basic concepts of memory and forgetting 3. Comprehended the thinking and intelligence

6.	PSY 202	Applied Social Psychology	2019	<ol style="list-style-type: none"> 1. Students understood about Social Influence 2. Acquainted with social exchange process in social behaviour. 3. Comprehended the prejudice and discrimination 4. To understand what is psychological groups and individuals.
7.	PSY 203	Psychopathology-II	2019	<ol style="list-style-type: none"> a. Understood anxiety and mood disorders b. Acquainted with somatic disorders. c. Studied Psychosis and Cognitive Disorders d. Understood Psychological Disorders Across the Life Span

8.	PSY 204	<ul style="list-style-type: none"> a. Psychological Measurements & Statistics b. Research Methodology c. Computer Applications in Psychological Research 	2019	<ul style="list-style-type: none"> 1. The students acquainted with intelligence and achievement tests 2. The students learned the measurement of personality tests 3. They are clear in understanding the Statistics for Psychological Measurement 4. They have knowledge on Distribution of Scores on Variables <p>1. Understood basic research and applied research including experimental research.</p> <ul style="list-style-type: none"> 1. The students comprehended the problem & hypothesis 2. Gained knowledge on Sampling & Data Collection 3. Understood the application of research designs <p>1. Understood the basic components of computer</p> <p>2. Acquainted with Ms Office, power point and internet services.</p> <p>3. Comprehended the application of computer knowledge through creating emails, scientific journals and data scoring</p> <p>4. Able to understand Statistical Packages and its application</p>
9.	CPSY 301	Counselling Process	2019	<ul style="list-style-type: none"> 1. Understood the counseling as helping profession 2. To acquire the relation with other helping professions 3. To know the legal and ethical issues 4. Developed the importance of verbal and non

10	CPSY 302	Counselling Skills	2019	<ol style="list-style-type: none"> 1. Understood the micro-skills of counseling through a series of practices. 2. Got an idea about who to understand the people and interpret their feelings with positive appreciation 3. To provide a space where participants can grow, in the sense of allowing an encounter with them first and based on this encounter to achieve a better understanding of how they impact on other people. 4. The ability to examine and assess the clients with scientific manner.
11	CPSY 303	Therapeutic Approaches in Counselling –I	2019	<ol style="list-style-type: none"> 1. Understood the various Therapeutic Approaches of counseling. 2. Understood the techniques relevant to therapies. 3. To acquires the basic procedures. 4. Learned how to touch in the insight of the client
12	CPSY 304A	a. Foundations of Personality	2019	<ol style="list-style-type: none"> 1. Understood nature of personality. 2. Realized the determinants of personality 3. Found that the development of Personality. 4. Understood the Assessment of personality
13	CPSY 304B	b. Lifespan Developmental Psychology – Infancy to Adolescence	2019	<ol style="list-style-type: none"> 1. Exposed the students to the basics of human development 2. Helped the student understand the stages of development 3. Understood the biological, social and emotional development 4. Able to evaluated the behavior of the individual at various stages.

14	CPSY 304C	c. Psychology of Disability	2019	<ol style="list-style-type: none"> 1. Understood the historical development and models of disabilities 2. Acquire the knowledge of assessment of disability. 3. Expertised on handling the disabled Behavior 4. Collected the knowledge about various service organizations
15	CPSY 305	Practical I & II	2019	<ol style="list-style-type: none"> 1. Studied biological, psychological determinants 2. The students aware of socio cultural determinants & Soft Skills 3. The students acquainted with soft skills 4. They learned more on Soft skills
16	CPSY 401	Applications of Counselling in Special Areas	2019	<ol style="list-style-type: none"> 1. Understood how to handle the client with various problems and hailing into different age groups. 2. Learned how to handle the clients with specific problems 3. To attained what is career, personal, vocational and other applied areas of counseling 4. Gained how to organize Counseling programs to handle special concerns in Different social settings.
17	CPSY 402	Therapeutic Approaches in Counselling –II	2019	<ol style="list-style-type: none"> 1. Understood the therapeutic approaches of counseling 2. Improve the major skills in therapeutic techniques 3. Gained specific methods involved in therapy 4. Adopted the different psycho therapeutic models of counseling.

18	CPSY 403	Family Counselling	2019	<ol style="list-style-type: none"> 1. Understand the need and importance of family counseling. 2. Improved how to handle the family issues 3. To maximized use of tools in counseling 4. Learned the specific skills to handle family issues.
19	CPSY 404A	a. Theories of Personality	2019	<ol style="list-style-type: none"> 1. Understood the Psychoanalytic Approach 2. Learned on behavioural approaches to personality. 3. The students comprehended the Humanistic approach 4. The students acquainted with the eastern theories of personality
20	CPSY 404B	b. Lifespan Developmental Psychology – Adulthood and Later Maturity	2019	<ol style="list-style-type: none"> 1. Understood about adult hood 2. Aware of infancy late adult hood problems 3. Identified the early and late old age issues. 4. Acquired the developmental tasks at all ages.
21	CPSY 404C	c. Rehabilitation Psychology	2019	<ol style="list-style-type: none"> 1. The students understood historical development – Models of disabilities in the past and present scenario 2. The students comprehended Assessment of Disability, Psychological Aspects 3. The students are aware of Behavioral Management 4. They acquainted with Organizational services
22	CPSY 405	Practical I & II	2019	<ol style="list-style-type: none"> 1. Learned the concept of life skills and its importance in relation to personality development of an individual. 2. They became aware of the components of life skills and the method of imparting knowledge of life skills. 3. The students have learned more on Life Skills in Specific 4. They acquainted with Self management skills

41. Statistics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	ST - 101	Linear Algebra	2019	<ol style="list-style-type: none"> 1. Students understood for estimation of elementary transformations in matrix and their solutions. 2. Students learnt about characteristic roots and vectors with numerical examples. They also know theoretical proofs of theorems. 3. Discriminate between diagonalizable and non-diagonalizable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms 4. Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in specific bases
	ST - 102	Probability Theory	2019	<ol style="list-style-type: none"> 1. Students must have knowledge about random variables, expectations, sets and their properties and inequalities where ever necessary. 2. Students also know the weak law, strong law and central limit theorem and their importance. 3. Students get the knowledge of the Central limit theorem and their real life uses. <p>Students can get the knowledge of the inequalities of probability and their uses.</p>

	ST - 103	Distribution Theory	2019	<ol style="list-style-type: none"> 1. Students know about different continuous and discrete distributions and their properties. 2. They have awareness about central and non-central sampling distributions and order Statistics. Idea about simple, partial and multiple correlation coefficients. 3. Students get the knowledge of the statistical Tests and their real life uses and applications. 4. Students get the knowledge of Regression and Correlations and their real-life applications
	ST - 104	Practical-I (75 Practical + 25 Record)	2019	<ol style="list-style-type: none"> 1. Numerical problems related to, Linear Algebra and Sampling Techniques are solved by executing programs of computers. 2. Linear algebra concepts when working with data preparation, such as one hot encoding and dimensionality reduction. 3. Applying linear algebra problems in real life situations. <p>Perform sampling methods analysis using R-software.</p>
	ST - 105	Statistical Computing	2019	<ol style="list-style-type: none"> 1. Students get the basic Programming Skills of C and C++. 2. Students learnt how the Data entre in the Excel with Headings. 3. Students get the knowledge of creating data ase using the MS-Access. <p>Students get the knowledge how to create the reports using MS-EXCEL and MS ACCESS.</p>

	ST - 106	Human Values and Professional Ethics-I	2019	<ol style="list-style-type: none"> 1. Students get the knowledge of the Ethical values. 2. Students get the idea about the Value education. 3. Students learn how to behave in Society. 4. Students get the knowledge of the Bhagavat Geetha and Can apply in their life's.
	ST - 201	Statistical Inference	2019	<ol style="list-style-type: none"> 1. Students know about point estimation, non-parametric models, Game theory, theorems and Proofs where ever necessary. 2. They can understand the concept of random sample from a distribution, sampling distribution of statistic, standard error of important estimates such as mean and proportions. 3. Students may gain the knowledge of testing of hypotheses (both large sample test and small sample test). <p>They can also calculate the problems related to point estimation and interval estimation.</p>
	ST - 202	Multivariate Analysis	2019	<ol style="list-style-type: none"> 1. Students learnt about importance of multivariate variables and their distributions 2. T^2, D^2, MANOVA models are understood and know it's importance. 3. Implement dimension reduction techniques using software on real life problems. <p>Classification analysis methods explained according to their classification algorithm.</p>

	ST-203 A & B & C	<p>(a) Linear Models and Applied Regression Analysis</p> <p>(b) Stochastic Processes</p> <p>(c) Mathematical Analysis</p>	2019	<p>A. Linear Models and Applied Regression Analysis</p> <ol style="list-style-type: none"> 1. Students learnt about different linear and non-linear regression models and their appropriate computational procedures. 2. They know R^2, adjusted R^2 and C_p criteria for model selection. 3. They will get the knowledge of building and fitting linear regression models with software. <p>They also learn about the theory underlying point estimation, hypothesis and confidence intervals for linear regression models.</p> <p>(b) Stochastic Processes</p> <ol style="list-style-type: none"> 1. Students understood stochastic processes, Markov chains, Poisson process, Renewal theory, Branching process, etc. 2. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. 3. Understand the consequences of the Intermediate value theorem for continuous function. 4. Know the chain rule and use it to find derivatives of composite functions and obtain expression for higher order derivatives of a function using the rule of differentiation. Solve integrals and evaluation of multiple integrals with numerical problems. <p>(c) Mathematical Analysis</p> <ol style="list-style-type: none"> 1. Students get the knowledge of real no.'s and set theory and their theories. 2. Students easily earn the knowledge of the sequencing theory. 3. Students get the knowledge if the integrations and their applications in the real life. <p>Students get the knowledge of the complex no. system and their applications I the statistics.</p>
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ST - 204	Practical-II (75 Practical + 15 Viva- voce + 10 Record)	2019		<ol style="list-style-type: none"> 1. Students know about the solving of Numerical problems related to Multivariate data. 2. Students can learn how the Statistical tests uses in their real life's by doing the tests on the Real times Data. 3. They can also use the statistical tools and techniques for analyzing the statistical data. <p>Students can solve the agriculture related problems using the Regression Methods.</p>
ST - 205	Sampling Techniques	2019		<ol style="list-style-type: none"> 1. Students learnt different sampling techniques of with replacement/ without replacement and Different sampling models. 2. Students studied non-Sampling errors and different remedies. 3. Implement Cluster sampling, Ratio and Regression estimation in real life problems 4. Apply unequal probability sampling designs viz. PPSWR, PPSWOR including Lahiri's method and Murthy's estimator for survey
ST - 206	Human Values and Professional Ethics-II	2019		<ol style="list-style-type: none"> 1. Students get the Knowledge of Status of Women in the family and society. 2. Students get the idea of the Medical Rights and Their responsibilities in the medical practitioners. 3. Students get the idea about the environmental Ethics. 4. Students Get the knowledge of Human Rights.

	ST - 301	Econometric Methods	2019	<ol style="list-style-type: none"> 1. Students learnt heteroscedasticity, multicollinearity and autocorrelation and their estimation procedures. 2. Students understood about different lag models and simultaneous linear equations model with their estimation methods. 3. Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model. 4. Understand the assumptions upon which different econometric methods are based and their implications.
	ST - 302	Design and Analysis of Experiments	2019	<ol style="list-style-type: none"> 1. Students learnt ANOVA, ANCOVA technique for one way and two-way classifications. Multiple comparisons tests using Tukey's, Duncans, Sheffe's and Dunnet's tests. 2. Students understood about Latin squares and their construction, missing plot technique etc. 3. Students explained about Incomplete Block Designs and their analysis, etc. 4. Understand the basic terms used in design of experiments by using appropriate experimental methods
	ST -303	Operations Research-I	2019	<ol style="list-style-type: none"> 1. Students understood about Dual primal, Revised simplex methods. 2. Students learnt non-linear programming, integer programming, CPM, PERT, different models of games. 3. Students can think the real-life problems in the way of Linear Programming Problems and try to solve the problems in Mathematical Way. 4. Students can take a decision in real life by Using the Game Theory Techniques.

	ST -304	Practical-III (75 Practical + 25 Record)	2019	<p>Students can understand the Statistical Methods in Economical Views.</p> <p>Students solved the Numerical problems related to operations research.</p> <p>Students Understand the Life Tables in Demography.</p> <p>Students can understand how the statistics use in biological aspects.</p>
	ST-305A	(a)Bio-Statistics	2019	<ol style="list-style-type: none"> 1. Students learnt about biological assay, their distribution and theorems, dose response relationships, basic concepts of biological assay, estimation methods of gene frequencies, etc. 2. Describe single and multi-species population growth models. 3. Apply the concept of deterministic and stochastic models on simple and general epidemics. 4. Understand linearization of dynamical systems with various dimensions.
	ST - 306	(a) Statistics for Biological and Earth Sciences	2019	<p>a) Statistics for Biological and Earth Sciences</p> <ol style="list-style-type: none"> 1. Students learnt about Graphs, measures of averages, measures of dispersion etc. 2. Students understood about Basic probability and important distributions with workout examples. 3. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests with examples. 4. Students used Advanced statistics tools with working illustrations.

	ST - 401	Time Series Analysis and Forecasting Methods	2019	<ol style="list-style-type: none"> 1. Students understood Time series analysis with some important growth models and their fitting 2. Students forecasting using regression, non-linear regression techniques, single, double, triple and adoptive exponential smoothing models. 3. Students obtained knowledge on AR, MA, ARMA, ARIMA, models fitting, diagnostic checking, etc. 4. Check and validate models with its residual analysis and diagnostic checking.
	ST - 402	Demography and Official Statistics	2019	<ol style="list-style-type: none"> 1. Students know the growth rates, life tables, GRR, NRR and growth models. 2. Students understood about gene frequencies, genotypes, phenotypes etc. 3. Students learnt about population census methods, organizations in India and their functions. 4. Useful to students as a means of analyzing and predicting social, cultural, and economic trends related to population.

	ST - 403	Operations Research-II	2019	<ol style="list-style-type: none"> 1. To perform Dynamic programming and their applications and computation procedure with illustration. 2. To discuss different Queuing models steady state solutions with examples. 3. To explain Inventory models with and without shortages, S-splicity, EOQ estimation with simple examples. <p>To understand Replacement problems such as block and age replacement problems, individual and group replacement policies with examples.</p>
	ST - 404	Practical-IV (75 Practical + 15 Viva-voce + 10 Record)	2019	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. 4. Students can understand how the statistics use in biological aspects.

	ST-405 A	(a) Statistical Process and Quality Control	2019	<ol style="list-style-type: none"> 1. Students understood the basic concepts of control charts for variables and their indices. 2. Students performed different control charts like Shewart's moving average, multivariate etc. with their applications. 3. Students used different sequential sampling plans and six sigma tool etc. in solving the problems. 4. Students have awareness about Total Quality Management.
	ST-405 B	Statistics for research, industry and Communitydevelopment	2019	<ol style="list-style-type: none"> 1. Students have done Simulation models, response surface models, demand analysis, social survey and their related measures. 2. Students can understand the basic of research blooms taxonomy of learning levels. 3. Find the topic from current research in statistics education. 4. Students can apply the tools in design, research and developments.

	ST-405 C	Advanced Econometric Models	2019	<ol style="list-style-type: none"> 1. Students understood GLM, SURE, nested and non-nested statistical models. 2. Students learnt about specification error, adding, switching models. 3. Students performed probit, logit models and their estimation. <p>Students can understand the qualitative and limited dependent variable models.</p>
	ST - 406 A	Business Analytics	2019	<ol style="list-style-type: none"> 1. Students learnt Graphs, measures of averages, measures of dispersion etc. 2. Students studied basic probability and important distributions with workout examples. 3. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests and discussed with examples. 4. Students performed advanced statistics tools for solving the problems.

	ST-406 B	(b) Survival Analysis	2019	<ol style="list-style-type: none"> 1. Students learnt about survival functions, their estimating methods, Distributions and their comparison for survival distributions. 2. Understand the elements of reliability, hazard function and its applications. 3. Understand the concept of censoring, life distributions and ageing classes. 4. Estimate nonparametric survival function of the data.
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Applied Statistics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	APST - 101	Linear Algebra	2019	<ol style="list-style-type: none"> 5. Students understood for estimation of elementary transformations in matrix and their solutions. 6. Students learnt about characteristic roots and vectors with numerical examples. They also know theoretical proofs of theorems. 7. Discriminate between diagonalizable and non-diagonalizable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms 8. Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in specific bases

	APST - 102	Probability Theory	2019	<p>4. Students must have knowledge about random variables, expectations, sets and their properties and inequalities where ever necessary.</p> <p>5. Students also know the weak law, strong law and central limit theorem and their importance.</p> <p>6. Students get the knowledge of the Central limit theorem and their real life uses.</p> <p>Students can get the knowledge of the inequalities of probability and their uses.</p>
	APST - 103	Distribution Theory	2019	<p>5. Students know about different continuous and discrete distributions and their properties.</p> <p>6. They have awareness about central and non-central sampling distributions and order Statistics. Idea about simple, partial and multiple correlation coefficients.</p> <p>7. Students get the knowledge of the statistical Tests and their real life uses and applications.</p> <p>8. Students get the knowledge of Regression and Correlations and their real-life applications</p>
	APST - 104	Practical-I (75 Practical + 25 Record)	2019	<p>4. Numerical problems related to, Linear Algebra and Sampling Techniques are solved by executing programs of computers.</p> <p>5. Linear algebra concepts when working with data preparation, such as one hot encoding and dimensionality reduction.</p> <p>6. Applying linear algebra problems in real life situations.</p> <p>Perform sampling methods analysis using R-software.</p>

	APST - 105	Statistical Computing	2019	<ol style="list-style-type: none"> 4. Students get the basic Programming Skills of C and C++. 5. Students learnt how the Data entre in the Excel with Headings. 6. Students get the knowledge of creating data ase using the MS-Access. <p>Students get the knowledge how to create the reports using MS-EXCEL and MS ACCESS.</p>
	APST - 106	Human Values and Professional Ethics-I	2019	<ol style="list-style-type: none"> 5. Students get the knowledge of the Ethical values. 6. Students get the idea about the Value education. 7. Students learn how to behave in Society. 8. Students get the knowledge of the Bhagavat Geetha and Can apply in their life's.
	APST - 201	Statistical Inference	2019	<ol style="list-style-type: none"> 4. Students know about point estimation, non-parametric models, Game theory, theorems and Proofs where ever necessary. 5. They can understand the concept of random sample from a distribution, sampling distribution of statistic, standard error of important estimates such as mean and proportions. 6. Students may gain the knowledge of testing of hypotheses (both large sample test and small sample test). <p>They can also calculate the problems related to point estimation and interval estimation.</p>

	APST - 202	Multivariate Analysis	2019	<ol style="list-style-type: none">4. Students learnt about importance of multivariate variables and their distributions5. T^2, D^2, MANOVA models are understood and know it's importance.6. Implement dimension reduction techniques using software on real life problems. <p>Classification analysis methods explained according to their classification algorithm.</p>
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	APST-203 A & B & C	<p>(a) Linear Models and Applied Regression Analysis</p> <p>(b) Stochastic Processes</p> <p>(c) Mathematical Analysis</p>	2019	<p>A. Linear Models and Applied Regression Analysis</p> <ol style="list-style-type: none"> 4. Students learnt about different linear and non-linear regression models and their appropriate computational procedures. 5. They know R^2, adjusted R^2 and C_p criteria for model selection. 6. They will get the knowledge of building and fitting linear regression models with software. <p>They also learn about the theory underlying point estimation, hypothesis and confidence intervals for linear regression models.</p> <p>(b) Stochastic Processes</p> <ol style="list-style-type: none"> 5. Students understood stochastic processes, Markov chains, Poisson process, Renewal theory, Branching process, etc. 6. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. 7. Understand the consequences of the Intermediate value theorem for continuous function. 8. Know the chain rule and use it to find derivatives of composite functions and obtain expression for higher order derivatives of a function using the rule of differentiation. Solve integrals and evaluation of multiple integrals with numerical problems. <p>(c) Mathematical Analysis</p> <ol style="list-style-type: none"> 4. Students get the knowledge of real no.'s and set theory and their theories. 5. Students easily earn the knowledge of the sequencing theory. 6. Students get the knowledge if the integrations and their applications in the real life. <p>Students get the knowledge of the complex no. system and their applications I the statistics.</p>
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	APST - 204	Practical-II (75 Practical + 15 Viva- voce + 10 Record)	2019	<p>4. Students know about the solving of Numerical problems related to Multivariate data.</p> <p>5. Students can learn how the Statistical tests uses in their real life's by doing the tests on the Real times Data.</p> <p>6. They can also use the statistical tools and techniques for analyzing the statistical data.</p> <p>Students can solve the agriculture related problems using the Regression Methods.</p>
	APST - 205	Sampling Techniques	2019	<p>5. Students learnt different sampling techniques of with replacement/ without replacement and Different sampling models.</p> <p>6. Students studied non-Sampling errors and different remedies.</p> <p>7. Implement Cluster sampling, Ratio and Regression estimation in real life problems</p> <p>8. Apply unequal probability sampling designs viz. PPSWR, PPSWOR including Lahiri's method and Murthy's estimator for survey</p>
	APST - 206	Human Values and Professional Ethics-II	2019	<p>5. Students get the Knowledge of Status of Women in the family and society.</p> <p>6. Students get the idea of the Medical Rights and Their responsibilities in the medical practitioners.</p> <p>7. Students get the idea about the environmental Ethics.</p> <p>8. Students Get the knowledge of Human Rights.</p>

	APST - 301	Applied Econometrics	2019	<ol style="list-style-type: none"> 1. Students learnt heteroscedasticity, multicollinearity and autocorrelation and their estimation procedures. 2. Students understood about different lag models and simultaneous linear equations model with their estimation methods. 3. Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model. 4. Understand the assumptions upon which different econometric methods are based and their implications.
	APST - 302	Experimental Design and Applications	2019	<p>Students learnt ANOVA, ANCOVA technique for one way and two-way classifications. Multiple comparisons tests using Tukey's, Duncans, Sheffe's and Dunnet's tests.</p> <p>Students understood about Latin squares and their construction, missing plot technique etc.</p> <p>Students explained about Incomplete Block Designs and their analysis, etc.</p> <p>Understand the basic terms used in design of experiments by using appropriate experimental methods.</p>
	APST -303	Applied Operations Research	2019	<ol style="list-style-type: none"> 1. Students understood about Dual primal, Revised simplex methods. 2. Students learnt non-linear programming, integer programming, CPM, PERT, different models of games. 3. Students can think the real-life problems in the way of Linear Programming Problems and try to solve the problems in Mathematical Way. 4. Students can take a decision in real life by Using the Game Theory Techniques.

	APST -304	Practical	2019	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. <p>Students can understand how the statistics use in biological aspects.</p>
	APST-305A	(a)Bio-Statistics	2019	<ol style="list-style-type: none"> 5. Students learnt about biological assay, their distribution and theorems, dose response relationships, basic concepts of biological assay, estimation methods of gene frequencies, etc. 6. Describe single and multi-species population growth models. 7. Apply the concept of deterministic and stochastic models on simple and general epidemics. 8. Understand linearization of dynamical systems with various dimensions.
	APST - 306	(a) Statistics for Biological and Earth Sciences	2019	<p>a) Statistics for Biological and Earth Sciences</p> <ol style="list-style-type: none"> 5. Students learnt about Graphs, measures of averages, measures of dispersion etc. 6. Students understood about Basic probability and important distributions with workout examples. 7. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests with examples. 8. Students used Advanced statistics tools with working illustrations.

	APST - 401	Applied Forecasting Methods	2019	<ol style="list-style-type: none"> 1. 1. Students understood Time series analysis with some important growth models and their fitting 2. Students forecasting using regression, non-linear regression techniques, single, double, triple and adoptive exponential smoothing models. 3. Students obtained knowledge on AR, MA, ARMA, ARIMA, models fitting, diagnostic checking, etc. <p>Check and validate models with its residual analysis and diagnostic checking.</p>
	APST - 402	Applied Demography and Official Statistics	2019	<ol style="list-style-type: none"> 5. Students know the growth rates, life tables, GRR, NRR and growth models. 6. Students understood about gene frequencies, genotypes, phenotypes etc. 7. Students learnt about population census methods, organizations in India and their functions. 8. Useful to students as a means of analyzing and predicting social, cultural, and economic trends related to population. 9. .
	APST - 403	Reliability Theory & Survival Analysis	2019	<ol style="list-style-type: none"> 1. Students learnt about and survival analysis with their related distributions, relationships, non-parametric methods for computing survival analysis. 2. Estimate nonparametric survival function of the data. 3. Explain test of exponentiality against nonparametric classes, two sample problems. <p>Understand the elements of reliability, hazard function and its applications.</p>

	APST - 404	Practical-IV (75 Practical + 15 Viva-voce + 10 Record)	2019	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. 4. Students can understand how the statistics use in biological aspects.
	APST-405 A	(a) Statistical Process and Quality Control	2019	<ol style="list-style-type: none"> 1. Students understood the basic concepts of control charts for variables and their indices. 2. Students performed different control charts like Shewart's moving average, multivariate etc. with their applications. 3. Students used different sequential sampling plans and six sigma tool etc. in solving the problems. 4. Students have awareness about Total Quality Management.
	APST-405 B	Statistics for research, industry and Communitydevelopment	2019	<ol style="list-style-type: none"> 5. Students have done Simulation models, response surface models, demand analysis, social survey and their related measures. 6. Students can understand the basic of research blooms taxonomy of learning levels. 7. Find the topic from current research in statistics education. 8. Students can apply the tools in design, research and developments.

	APST-405 C	Actuarial Statistics	2019	<ol style="list-style-type: none"> 1. Students get the knowledge of the Economic interest rates and discount rates. 2. Students know how to construct the life tables based on the Expectancy. 3. Students to get awareness of the life annuities. 4. Students ensure how to build joint life annuities and life survivor annuities.
	APST - 406 A	Statistics for Marketing Research	2019	<ol style="list-style-type: none"> 1. Students learnt about Research design and how to frame questionnaire etc. 2. Statistics relating to research like univariate test like Z, t, F, ANOVA, CRD, RBD and LSD are done. 3. Multivariate statistical techniques like factor analysis, dissemination analysis and cluster analysis are used. 4. Students can understand how the marketing is happening in the real life.

	APST-406 B	(b) Statistical analysis using SPSS	2019	<ol style="list-style-type: none"> 1. Able to create and manipulate vectors, matrices, arrays, data frames and lists. 2. Should be able to work with character data, factor data and dates. 3. Able to write scripts and function in R and read data from .csvfiles, EXCEL files and SPSS files. <p>Able to use built-in functions to answer questions relating to probability distributions, parametric and non-</p>
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43. Virology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	VR-101	General Microbiology	2019	<ul style="list-style-type: none"> - To learn about fundamentals aspects of microbiology including origin, evolution of microorganisms, different groups of microorganisms and their importance, microscopy principles and applications, morphology, and structure of bacteria, - To learn about Microbiological media, isolation, cultivation and enumeration methods of microorganisms, microbial growth characteristics, maintenance, and preservation of microbial cultures. - To develop knowledge on microbial taxonomy, transport of nutrients in microbes, control strategies of microorganism, - To develop knowledge on general characteristics, structure and reproduction of fungi, algae, and protozoan parasites.
2	VR-102	General Virology	2019	<ul style="list-style-type: none"> - Learn the discovery, nature, origin and evolution of viruses and the physical, biochemical, and biological properties of viruses, criteria used for nomenclature and classification of bacteria, plant and animal viruses. - Describe the methods used for isolation, cultivation, and purification of viruses and criteria of purity. - Define biological, physical, biochemical, and serological methods used for quantitation of viruses, major characteristics of important plant and animal virus families and biology and applications of major RNA and DNA viruses of insects. - Understand the biology of major bacteriophages, algal and fungal viruses, subviral agents and importance of viruses in human welfare with suitable examples.

3	VR-103	General Microbiology and Virology	2019	<ul style="list-style-type: none"> - Define laboratory safety measures that needs to be followed in Virology and Microbiology laboratories and know the concepts and protocols of using different sterilization methods and preparation of media. - Acquire the practical skills to use various methods for cultivation, staining and characterization of different microorganisms and to check their stability under various conditions. - Learn to isolate bacteriophages from different sources and cultivate viruses in embryonated eggs and plants. - Demonstrate the mechanical, aphid and graft transmission of plant viruses and methods used to check the stability of viruses and determine the effect of virus infection on plants through chlorophyll estimation.
4	VR-104	Biological Chemistry and Analytical Techniques	2019	<ul style="list-style-type: none"> - : Learn to calculate normality, molarity, molecular weight and percentage of chemical substances and qualitative and quantitative estimation of proteins, carbohydrates, lipids, and nucleic acids. - Know how to isolate and check the activity of enzymes from various sources. - Learn to use ultrafiltration, chromatography, and electrophoresis techniques for isolation and characterization of biomolecules. - Acquire the skills to use spectroscopic and centrifugal methods for isolation and characterization of biomolecules apply this practical oriented knowledge in Cell Biology and Immunology to foster employability in private industries, higher education in premier institutes.
5	VR-105	Biological Chemistry and Analytical Techniques	2019	<ul style="list-style-type: none"> - Acquire knowledge on major elements and biomolecules of life and their chemical composition, bonding and primary characteristics, classification, structure, functions of carbohydrates, nucleic acids, amino acids, peptides, proteins and lipids and mechanism of protein synthesis and degradation.

				<ul style="list-style-type: none"> - Understand the types, properties, biological functions of enzymes, nucleic acids, hormones, growth regulators, vitamins, porphyrins and other pigments and nucleic acid metabolism. - Describe the approaches involved in characterization and concentration of biomolecules and discuss the principles and applications of various techniques applied for characterization of biomolecules in biological research such as chromatography, centrifugation, electrophoresis, - Learn about electrochemical techniques, basic principles and applications of flow cytometry, radioisotopes, spectroscopy, amino acid, and nucleotide sequencers
6	VR-106	Human values and Professional ethics - I	2019	<ul style="list-style-type: none"> - To enable the students to imbibe and internalize the moral values and ethical principles - 2. To learn ethics moral and social values and ethical behavior in the personal and Professional lives. - 3.To learn the rights and responsibilities and to appreciate the rights of others and to create awareness on religious values and other good acts and facts of life. - 4.To acquire knowledge about the important facts of Bhagavad Gita, values hidden in religions, religious tolerance and aware of crime, and punishment theories
8	VR-201	Microbial Genetics and Molecular Biology	2019	<ul style="list-style-type: none"> - To gain understanding of prokaryotic and eukaryotic genome organization, modern concept of genes, plasmids, mobile genetic elements - To learn gene transfer and mapping mechanisms in bacteria, genetics of viruses and requirements and mechanism of DNA replication. - To attain knowledge about the mechanism of DNA damage and repair, concept of mutations and their importance, processes involved in transcription, - To attain knowledge about the mechanism of translation, regulation of gene expression and gene silencing mechanisms.
9	VR-202	Recombinant DNA	2019	<ul style="list-style-type: none"> - To learn basic and advanced tools and techniques, approaches and strategies used in gene manipulation in prokaryotic and eukaryotic systems.

		Technology		<ul style="list-style-type: none"> - 2.To learn themajor techniquesand applications of gene manipulation such asDNA sequencingnucleic acid hybridization - 3. To understand the strategies used for gene expression in heterologous hosts,proteomics, genomics. - 4.To generate knowledge on genetically modified plants and animals and applications/implications of genetic engineering in agriculture, medicine, industry, and biology.
10	VR-203	Microbial Genetics and Molecular Biology & Recombinant DNA Technology	2019	<ul style="list-style-type: none"> - Learn the safety practices and precautions to be followed in setting up Cell and Molecular Biology laboratory with ribonuclease free environment. - Isolate and estimate DNA and RNA from microbial, plant and animal tissues and demonstrate curing of plasmids.replica plating techniques, conjugation in bacteria, Ames test, induction of mutations in bacteria by physical/chemical agents, isolation of microbial mutants by gradient plate method. - Acquire practical skills to isolate plasmids from bacteria, restriction enzyme digestion of recombinant plasmid DNA, recovery of DNA from gels, transformation of bacteria and demonstrate the preparation of southern and dot blots for hybridization. - Solve the problems related toMolecular Genetics/Biology and Recombinant DNA Technology and compete for the competitive exams such as UGC-CSIR-NET, GATE, APSET and other scientific examinations.
11	VR-204	Cell biology and Immunology	2019	<ul style="list-style-type: none"> - Acquire the practical skills in conducting various experiments related to Cell Biology such as isolation of cells, preparation of cell cultures. - Learn isolation of mitochondria, study of chromosomes, identification of stages of mitosis in onion root tips. - Identify of primary and secondary lymphoid organs in virtual animal model

				<p>and illustrate basic immunology techniques such as counting of RBC and WBC, estimation of hemoglobin, identification of the blood groups and Rh.</p> <ul style="list-style-type: none"> - Demonstrate antigen-antibody interactions by conducting <i>in vitro</i> serological tests such as immunodiffusion and immune-electrophoresis, DAC-ELISA, Dot-ELISA and western blotting and apply this practical oriented knowledge in Cell Biology and Immunology to foster employability in private industries, higher education in premier institutes.
12	VR-205	Cell biology and Immunology	2019	<ol style="list-style-type: none"> 1.To understand the structure and contents of prokaryotic and eukaryotic cells, general principles and pathways of cell communication and cell signaling. 2. To describe the concepts and methodologies of plant and animal tissue and organ cultures, cell counting and introduction to stem cell cultures. 3..To learn about the historical perspectives of immunology, innate and adaptive immunity mechanisms, various components of immune system, antigens, antibodies, <i>in vitro</i> and <i>in vivo</i> antigen and antibody interactions and 4.To understand the mechanism of humoral and cell mediated immune responses, immune effector mechanisms, MHCs, hypersensitivity reactions, autoimmune and immunodeficiency disorders, transplantation and transfusion immunology and concepts and applications of conventional and modern vaccines.
13	VR-206	Human values and Professional ethics - II	2019	<ul style="list-style-type: none"> - Understand the definition of value education, concept of human and family values, components, structure, and responsibilities of family system and acquire reflective thinking, rational skepticism. - Describe the moral responsibilities and ethical issues of medical and health care professionals, avoid unethical things, learn ethical issues raised in genetic engineering and new biological technologies. - Learn to practice ethical standards in business by understanding ethical theories and maintain work ethics to build trust between businessman and consumer and avoid unethical behavior and ethical abuse and develop scientific temper, digital literacy.

				<ul style="list-style-type: none"> - Learn to practice environmental ethics by taking responsibility to protect environment and ecosystem and understand the importance of maintenance of social ethics and ethics of media.
14	VR-301	Plant Virology	2019	<ul style="list-style-type: none"> - Understand the induction of plant virus diseases, virus-host interactions and movement strategies. - Learn the vector and non-vector modes of plant virus transmission, virus-vector relationships and molecular mechanisms involved in virus vector interactions and the approaches used for identification and characterization of the viruses and virus strains. - Acquire the knowledge on plant virus spread and survival in nature and approaches used to detect plant viruses and diseases. - Describe the approaches used for the control and management of plant viruses and vectors and strategies used for acquiring plant virus resistance.
15	VR-302	Plant Viruses and Diseases	2019	<ul style="list-style-type: none"> - To understand the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of cereals and millets, oil seed crops - To understand the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of vegetable, and tuber crops. - To acquire knowledge on the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of food legumes, fruit crops - To acquire knowledge on the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of cash, spice and beverage crops and flowering and foliage ornamentals.
16	VR-303	Plant Virology or Plant	2019	<ul style="list-style-type: none"> - Identify major virus diseases of local economically important crop plants and weeds through theory exercises, local field surveys, agricultural research

		Viruses and Diseases		<p>station visits.</p> <ul style="list-style-type: none"> - Determine and compare the effect of virus on cell size, chloroplast number, total carbohydrates, proteins, and lipids with healthy counterparts. - :Detect unknown viruses through ELISA and PCR (theory exercise and practical) and demonstrate plant virus transmission by seed and vegetative propagules and generation of virus free plants through apical meristem tip culture. - Identify local plant virus vectors, determine virus disease incidence, and progress curves through local field visits. -
17	VR-304	a) Molecular Virology (OR)	2019	<ul style="list-style-type: none"> - Acquire the skills to use the techniques involving purification of viruses such as maintenance of virus cultures on propagation hosts, clarification using organic solvents and low speed centrifugation, precipitation using sodium chloride or ammonium sulphate or polyethylene glycol or differential centrifugation, preparation of step and linear density gradients, further purification of viruses using sucrose density gradient centrifugation and final pelleting by ultrafiltration or ultracentrifugation and to check the quality and quantity of viruses using spectroscopy or transmission electron microscopy. - Isolate virus coat proteins and determine its quantity and molecular weight through spectroscopy and SDS-PAGE, respectively. - Isolate virus nucleic acids (dsRNA, RNA and DNA), estimate their quantity by spectroscopy, determine their size and molecular weight through agarose gel electrophoresis. Determine the stability of virus by studying effect of physical and chemical agents on virus inactivation.
		b) Biostatistics and		<ul style="list-style-type: none"> - Learn how to use MS office and create, edit tables in MS word.

		Bioinformatics		<ul style="list-style-type: none"> - Develop knowledge to do simple statistics with Excel, to create statistical graphs and spread sheets in Excel for biological applications. - Use internet, web tools, databases, and search engines for designing, planning, and executing biological research experiments or investigations. - Analyze viral genome sequences using programs like Bio Edit and learn to use NCBI, EMBL for nucleic acid/protein analysis and phylogenetic tree construction. -
18	VR-305	(a) Molecular Virology (OR)	2019	<ul style="list-style-type: none"> - Acquire the skills to use the techniques involving purification of viruses such as maintenance of virus cultures on propagation hosts, clarification using organic solvents and low speed centrifugation, precipitation using sodium chloride or ammonium sulphate or polyethylene glycol or differential centrifugation, preparation of step and linear density gradients, further purification of viruses using sucrose density gradient centrifugation and final pelleting by ultrafiltration or ultracentrifugation and to check the quality and quantity of viruses using spectroscopy or transmission electron microscopy. - Isolate virus coat proteins and determine its quantity and molecular weight through spectroscopy and SDS-PAGE, respectively. - Isolate virus nucleic acids (dsRNA, RNA and DNA), estimate their quantity by spectroscopy, determine their size and molecular weight through agarose gel electrophoresis. - Determine the stability of virus by studying effect of physical and chemical agents on virus inactivation.
		(b) Biostatistics and Bioinformatics		<ul style="list-style-type: none"> - Learn how to use MS office and create, edit tables in MS word. - Develop knowledge to do simple statistics with Excel, to create statistical graphs and spread sheets in Excel for biological applications.

				<ul style="list-style-type: none"> - Use internet, web tools, databases, and search engines for designing, planning, and executing biological research experiments or investigations. - Analyze viral genome sequences using programs like Bio Edit and learn to use NCBI, EMBL for nucleic acid/protein analysis and phylogenetic tree construction. -
19	VR-306	(a) Biology of Viruses and their Management (OR)	2019	<ul style="list-style-type: none"> - Describe the discovery, isolation, propagation, and assay of viruses of bacteria and biology of bacteriophages of enterobacteria. - Understand the biology and properties of representative widely occurring phages, phages of cyanobacteria, mycoplasmas, mycoplasmas, archaea. - Learn about biology and properties of major viruses of fungi and yeast. - Acquire knowledge about biology and properties of major viruses of higher fungi, algae, and protozoa
		(b) Biology of Virus Vectors and their Management		<ul style="list-style-type: none"> - Understand the insect morphology and classification, types, structure of virus vectors, culturing, collection, preservation, and transportation of virus vectors and molecular approaches for identification of major arthropod virus vectors. - Describe the biology, ecology, and life cycle of mosquitoes with reference to major mosquito-borne virus diseases and physical, chemical, biological, and other approaches for prevention and management of animal and human virus vectors in urban and rural settings. - List and discuss the important vectors transmitting plant viruses, their culturing, virus vector relationships, molecular mechanisms of vector transmission, effects of viruses on vectors. - Learn about biology, ecology and life cycle of nematodes and fungal vectors and demonstration of experimental nematode and fungal transmission of plant viruses, impact of climatic factors, soil vectors and cropping practices on

				epidemiology of vector-borne viruses, physical, chemical, biological, and other approaches for prevention and management of plant virus vectors and natural and transgenic vector resistant crops.
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20	VR-401	Animal and Human Virology	2019	<ul style="list-style-type: none"> - Understand the virus host interactions, host defense mechanisms against viruses and innate and adaptive immune responses to viruses, molecular mechanisms of viral pathogenesis with respect to polio, rotavirus, and cytomegalovirus. - Describe the various modes of vertical and horizontal transmission of animal and human viruses, zoonotic virus infections, mechanism of virus persistence, routes of entry and mechanism of virus spread in the body. - Learn about the epidemiological concepts of virus diseases, measures of disease occurrence, prevalence, and mapping, determinants of disease, factors affecting virus ecology and epidemiology of animal and human viruses. - Acquire knowledge on virus disease surveillance, strategies of virus maintenance in communities, principles of virus disease survey, methods of prevention and control of animal and human viruses.
21	VR-402	Animal and Human Virus Diseases	2019	<ul style="list-style-type: none"> - Learn the safety practices and To describe the etiology, transmission, clinical manifestations, diagnosis, prevention and control of important (+) sense ssRNA viruses infecting animals and humans. - To describe the etiology, transmission, clinical manifestations, diagnosis, prevention and control of important (-) sense ssRNA viruses infecting animals and humans - To understand the etiology, transmission, clinical manifestations, diagnosis, prevention, and control of important DNA viruses infecting animals and human - To learn about the prion diseases, biology, prevention, and management of major viruses of silkworm, poultry, fish and prawn, emerging and reemerging virus diseases

22	VR-403	Animal and Human Virology & Virus Diseases	2019	<ul style="list-style-type: none"> - Understand the biosafety, biosecurity, and ethical guidelines to be followed in the Molecular Virology laboratory. - Learn the technologies related to preparation of media for cell/tissue cultures, preparation of cell cultures/embryonated eggs for virus cultivation and isolation and quantitation of viruses using differential centrifugation and symptomatology/spectroscopy, respectively. - Develop skills to test the plant and human viruses using serological and molecular tests and kit-based methods. - Acquire knowledge on virus-based nanotechnology protocols, virus epidemic by doing extension activities and visiting field, poultry, agriculture research station and aqua farms
23	VR-404	Project work related to Virology (OR) (a) Applied Virology (OR)	2019	<ul style="list-style-type: none"> - Acquire the skills to prepare the cell cultures and embryonated eggs for cultivation of plant, animal and human viruses and to isolate and quantitate viruses. - Learn the methods to detect plant and animal viruses and able to analyze various types of results obtained from serological and molecular viral diagnostic methods. - Apply the skills acquired to prepare NPV as biopesticides and virus-based nanoparticles and their isolation using analytical methods. - Participate in extension activities and field, poultry, agriculture research station and aqua form visits.
		(b) Tumor Biology and Viruses		<ul style="list-style-type: none"> - Acquire skills to detect carcinogens and mutagens using standard tests such as Ames test. - Distinguish transformed and normal cell lines and determine the anticancer property of biologically active compounds.

				<ul style="list-style-type: none"> - Design and execute PCR and other point of care methods using commercial kits for detection of tumor viruses (HCV, HIV, HPV). - Perform cultivation of poultry tumor viruses in cell cultures and acquiring the knowledge on histopathology of animal tumor viruses. -
24	VR-405	(a) Applied Virology (OR)	2019	<ul style="list-style-type: none"> - Understand the basic concepts, types, requirements and methodologies of plant/animal cell and tissue cultures used for cultivation of plant and animal viruses. - Learn the production of recombinant DNA technology-based antibodies and vaccines to viruses and the concepts and methods of production of virus resistant/tolerant crops and virus-based biopesticides. - :Acquire knowledge about common virus infections caused to human beings through vector and non-vector borne modes and basic principles of biosafety, biosecurity, and ethical/regulatory issues in Virology and basics in Intellectual Property Rights (IPR). - Understand the utilization of viruses as viral genes/sequences as unique genetic resources, novel enzymes, gene expression activators and silencers, gene delivery systems, epitope display platforms and model systems in understanding the replication of nucleic acids and regulation of gene expression strategies and cancer biology, phage display and therapy technologies and viruses as biological weapons.
		(b)Tumor Biology and Viruses		<ul style="list-style-type: none"> - Acquire knowledge about the basic aspects of tumors, distinguish normal and transformed cells and describe the role of oncogenes and tumor suppressor genes in causing cancers. - Understand the role and mechanism of carcinogens in inducing carcinogenesis and molecular viral mechanisms of transformation and tumorigenesis.

				<ul style="list-style-type: none"> - Describe the role of oncogenes, tumor suppressor genes, viral oncogenes, types, and mechanism of RNA viruses in inducing tumors. - List the DNA viruses causing tumors and learn their tissue transformation mechanisms, role of tumor suppressor genes in tumor suppression, immune mechanisms against tumors, immunotherapy, and physical and chemical therapeutic interventions against tumors.
25	VR-406	(a) Clinical Virology (OR)	2019	<ul style="list-style-type: none"> - Acquire basic understanding of virus properties, virus replication and learn methods of virus isolation and characterization of viruses using serological and molecular techniques. - Learn to collect, preserve the virus samples, and detect the viruses using biological, serological, and molecular methods, laboratory biosafety and quality control practices. - Understand the principles of epidemiology, disease occurrence patterns, disease surveillance and control strategies, concept, and methods of modern vaccines to viruses. - Learn about the approaches used for prevention and control of clinically important infectious caused by human viruses, unconventional slow viruses, and prions.
		(b) Emerging Infectious Viral Diseases		<ul style="list-style-type: none"> - Understand the evolution, biology, epidemiology, and emergence of infectious virus diseases, biology of emerging infectious diseases, zoonotic infections - Learn about the biology, clinical symptoms, epidemiology, diagnosis, and control of viruses causing AIDS and SARS and host defense mechanisms against infectious virus diseases. - Describe the biology, clinical symptoms, epidemiology, diagnosis, and control of vector borne emerging infectious viral diseases.

				- Acquire knowledge on impact of social and environmental change on emergence of viruses, vector control and antiviral therapies, vaccines, public health measures and bioterrorism.
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44. Zoology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ZOO-101	Invertebrata & Chordata	2019	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respect to their habit and habitat.</p> <p>iii. In depth understanding of Anatomical features of Integumentary, Circulatory, Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.</p>
2	ZOO-102	Genetics & Evolution	2019	<p>i. Students will appreciate the concept of epigenetics as a key mechanism of regulation of gene expression steering development and cell fate that can ultimately be affected in disease condition</p> <p>ii. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations, Natural Selection and Genetic drift.</p>

				<p>iv. Understood the concepts of Micro, Macro evolution speciation categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.</p>
3	ZOO-103P	Practical-I Invertebrata & Chordata and Genetics	2019	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. Understanding the comparative aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in taxonomy related research and job opportunities.</p> <p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p>
4	ZOO-104P	Practical-II Metabolic Regulation & Cell Function and Evolution	2019	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight into biological processes.</p>

				<p>iv. Understood that the four propositions underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
5	ZOO-105	Metabolic Regulation & Cell Function	2019	<p>i.The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p>
6.	ZOO-106	Human Values and Professional Ethics-I	2019	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p>

				<p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
7.	ZOO-201	Cell Biology & Immunology	2019	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the ultra-structural information of animal cell besides the detailed views of the cell interior revealing the various events and actions of cell at the molecular level.</p> <p>iii. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the principles of Graft rejection, Auto immunity and Antibody based therapy.</p>
8.	ZOO-202	Molecular Biology	2019	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p>

				<p>ii. Students will gain expertise in understanding the complex molecular mechanisms occurring in cell and the applications of molecular technologies for betterment of life.</p> <p>iii. Understand and apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the health Professions.</p>
9.	ZOO-203P	Practical-I Molecular Biology and Cell Biology	2019	<p>i. Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they will also know the various tools and techniques related to bacterial microbiology.</p> <p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p>
10.	ZOO-204P	Practical-II Comparative Animal Physiology and Immunology	2019	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to</p>

				<p>the fullet.</p> <p>iii. Learn the fundamental principles of immune response including molecular, biochemical and cellular basis of immune homeostasis.</p> <p>iv. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.</p>
11	ZOO-205	Comparative Animal Physiology	2019	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. An appropriate understanding of functioning of each system of different groups of animals with their comparison will be acquainted.</p> <p>iii. Understanding of the basic concepts of Physiological regulation, from cellular to organ to organismal.</p> <p>iv. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet.</p>
12	ZOO-206	Human Values and Professional Ethics-II	2019	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	ZOO-301	Developmental Biology	2019	<p>i. Students would gain expertise in explaining</p>

				<p>how a variety of interacting processes generate an organism's heterogeneous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p> <p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity complex and coordinated systems in organisms the students can apply this knowledge for research, and education, to solve the problems related to development in animals through research.</p>
14	ZOO-302	Environmental Biology	2019	<p>i. Students will be able to apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.</p> <p>ii. Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.</p> <p>iii. Students will be able to be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p> <p>iv. Students will be able to use technology, such as geographical information systems and computer programming, to assist in problem solving.</p>
15	ZOO-303P	Developmental Biology and Tools & Techniques	2019	<p>i. Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences.</p>

				<p>Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>iv. Students would gain basic knowledge of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study and understanding of life processes.</p>
16	ZOO-304P	Environmental Biology and Enzymology	2019	<p>i. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to Education, Research and Extension programmes in his further career.</p> <p>ii. Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>iii. Students learn about enzymes. Their classification and nomenclature</p> <p>iv. Students learn about specificity of enzymes</p> <p>v. Students learn about measurement of</p>

				enzymatic activity vi. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.
17	ZOO-305A	Tools & Techniques	2019	<p>i. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>ii. Identify and describe the different equipment and tools used in a biology laboratory.</p> <p>iii. Correctly operate different laboratory instruments.</p> <p>iv. Correctly operate different types of microscopes.</p> <p>v. Prepare tissue for section cutting and correctly operate a microtome.</p>
18	ZOO-305B	Enzymology	2019	<p>i. Students gain knowledge about regulation of enzyme activity with respective mechanisms</p> <p>ii. To understand about mechanism of enzymes in clinical diagnosis and their applications</p> <p>iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.</p>
19	ZOO-305C	Bioinformatics & Biostatistics	2019	<p>i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology.</p> <p>ii. Describe different methods of data handling using computer.</p> <p>iii. Perform basic operations of gene sequence retrieval and compare them using different software.</p> <p>iv. Perform basic operations of protein structure retrieval and comparison using different software.</p> <p>v. The student will learn about the Computer basics like Operating systems, Programming,</p>

				<p>Data Access, Internet and Nucleic acid Sequence and Protein Data Banks.</p> <p>vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of dispersion like Mean deviation and Standard deviation and Co-efficient of Variation.</p> <p>v. The course will aid in learning Test of significance like Null hypothesis and Alternative hypothesis, t-test, F-test, Chi-square test, Correlation and Regression analysis.</p>
20	ZOO-306A	Economic Zoology	2019	<p>i. Creating the self-employment opportunities to rural students through Animal husbandry, Aquaculture, Vermiculture and Sericulture.</p> <p>ii. To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices.</p> <p>iii. Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.</p>
21	ZOO-306B	Structural Biology	2019	<p>i. Understand the evolution of protein structural motifs and domains and associate this with function;</p> <p>ii. Use on-line structural databases and tools to predict the properties, structure and function of proteins.</p> <p>iii. Understand and explain enzyme mechanisms in a structural context.</p> <p>iv. Describe mechanisms of protein folding and the roles of natively unstructured proteins in biology.</p> <p>v. Understand how cross-talk between proteins</p>

				and post-translational protein modifications (e.g. phosphorylation, ubiquitination) facilitate information processing in cells.
22	ZOO-306C	Human Health and Infectious diseases	2019	<p>i. To understand the basic concepts of Infectious diseases and the role of immunity to control infections</p> <p>ii. Provides knowledge on the physiological mechanisms leading to diseased conditions.</p> <p>iii. Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv. This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>
23	ZOO-401	Neurobiology	2019	<p>i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials</p> <p>ii. Students leant and gain knowledge on structure and function of different types of Synapses</p> <p>iii. Gained information on different types of Neurotransmitters i.e. Amino acids and Peptides.</p>
24	ZOO-402	Toxicology	2019	<p>i. The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research.</p> <p>ii. Understanding of the physiological and genotoxic effects of drugs and environmental toxins.</p> <p>iii. To understand various types of insecticides and understand their mode of action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible with other control strategies.</p> <p>iv. The students will learn handling of the</p>

				pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.
25	ZOO-403P	Neurobiology and Animal Biotechnology & Microbiology	2019	<ul style="list-style-type: none"> i. Learnt about structure, function and organization of Neurons in the Central nervous system ii. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials. iii. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny. iv. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effective communicate with both specialist and non-specialist audiences/community.
26	ZOO-404P	Toxicology and Animal Behavior & Wild life	2019	<ul style="list-style-type: none"> i. Skill development in environmental and occupational Toxicology. ii. It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain. iii. Identification of different routes of exposure of environmental toxins. iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning. v. To understand the overview of Animal Behavior and prominence of social organization

				<p>in insects and primates.</p> <p>vi. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>vii. To understand how to conserve the wild animals</p>
27	ZOO-405A	Animal Biotechnology & Microbiology	2019	<p>i. Understanding of in vitro culturing of organisms and production of transgenic animals.</p> <p>ii. Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors.</p> <p>iii. This insight allows students to take into consideration about ethical issues involved in production of transgenic animals and BT products.</p> <p>iv. Use in gene transfer technology, genetic manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p> <p>v. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny</p> <p>vi. Classify the nutritional types of microorganisms and measure microbial growth</p> <p>vii. Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>viii. Assess impact of plant- microbe interaction on agriculture in both beneficial and detrimental ways. Identify industrially important microbes.</p>
28	ZOO-405B	Animal Behavior & Wild life	2019	<p>i. Understand the overview of Animal Behavior</p>

				<p>and prominence of social organization in insects and primates</p> <p>ii. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>iii. To understand the how to conserve wild animals and management strategies.</p> <p>iv. To gain the knowledge about wild animals and animal products importance.</p>
29	ZOO-405C	Endocrinology	2019	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic pathways.</p> <p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
30	ZOO-406A	Genetic Engineering	2019	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p> <p>ii. Students will be able to perform basic genetic engineering experiments at the end of course.</p> <p>iii. Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.</p>
31	ZOO-406B	Environmental Impact Assessment & Green Auditing	2019	<p>i. Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment</p> <p>ii. Explain the importance of environmental</p>

				audits and other management tools in business for social benefit by improving environmental performance iii. Calculate the carbon footprint of any organization and identify suitable mitigation strategies for carbon reduction solutions.
32	ZOO-406C	Medical Biotechnology, IPR, Biostatistics and Bioethics	2019	i. Students will gain awareness about Intellectual Property Rights (IPR) to take measures for protecting their ideas. ii. Gains knowledge on the Developmental stages of organism in Animal Biotechnology. iii. To understand and they will be able to devise business strategies by taking account of IPRs. iv. Students will develop awareness about bioethics and biosafety, Authorship and patenting / commercial rights and conflicts.

Animal Biotechnology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ABT- Core-101	Metabolic Regulation & Cell Function (MRCF)	2019	<ul style="list-style-type: none"> • Knowledge on chemical bonds, thermodynamics principles and metabolisms of Glycolysis, TCA Cycle and their biomedical importance will be gained. • Metabolic disorders of urea cycle and importance of proteins structure and functions can be understood. • Biosynthesis of purine and pyrimidine nucleotide and Clinical disorders of purine and

				<p>pyrimidine metabolism can be learnt</p> <ul style="list-style-type: none"> • To become proficient in Biomedical importance of lipids and over view metabolism of carbohydrate, protein and lipids
2	ABT- Core-102	Tools & Techniques (TT)	2019	<ul style="list-style-type: none"> • Skills will be acquired on chromatography, centrifugation, electrophoresis and blotting techniques • To get knowledge on cell and tissue culture, cell types, culture media and overview of stem cell biology • To acquire skill on electrganetic spectrum, type of detectors, electophysiological methods and brain activity recording techniques • Microscopic techniques, different fixation and staining techniques, tissue processing for microtomy, cryotechiques will be learnt
3	ABT-Core-P-103	Metabolic Regulation & Cell Function	2019	<ul style="list-style-type: none"> • Practical knowledge will be gained on biochemical assays like estimation of proteins, structural proteins, soluble proteins, free amino acids, total carbohydrates and total cholesterol. • To gain knowledge in handling equipments like cooling centrifuge, autoclave, laminar air flow etc., and, maintenance of animal cell culture laboratory. <p>To learn microbial media preparation for their culture and identification</p>
4	ABT-Core-P-104	Tools & Techniques	2019	<ul style="list-style-type: none"> • Isolation of DNA from chick liver • Agarose gel electrophoresis • Estimation of DNA and RNA by diphenyl anime method and orcinal method • Paper chromatography • Platting procedures

				<ul style="list-style-type: none"> • Gram staining • Anti microbial susceptibilities test
5	ABT-CF-105	Microbiology and Diseases	2019	<ul style="list-style-type: none"> • Microorganisms classification and structure of prokaryotic and eukaryotic microorganism can be understood • To get knowledge on Nutritional requirements to microorganisms, growth of microorganism, control of microorganism and microbes of biotechnological importance • To become proficient in chemical nature of gene, plasmids incompatibility, horizontal transfer of genome among the microbial community and Benzer's classical studied on II locus • To learn diseases caused by microorganism
6	ABT -EF-106	Human Values & Professional Ethics (HVPE)-I	2019	<ul style="list-style-type: none"> • Knowledge will be gained on nature of ethics its relation to religion. Politics, Business • To understand nature of values Good and Bad, end and means, analysis of basic moral concepts, good behavior and respect for elders, character and conduct • Proficient on hagavad Githa • Crime and theories of punishment will be learnt
7	ABT- Core-201	Molecular Biology (MB)	2019	<ul style="list-style-type: none"> • To gain knowledge on DNA structure, genome of Nuclear and mitochondrial and maternal Inheritance • To understand replication in prokaryotes, Enzymology of DNA replication, Discontinuous replication and Bidirectional replication • Synthesis of RNA, Types of RNA, Genetic code and Ribosome structure will be understood

				Knowledge will be gained regulation I and II and Operon concepts
8	ABT- Core-202	Animal Cell culture & Stem Cell Biology (ACC-SCB)	2019	<ul style="list-style-type: none"> • To understand animal cell culture, biology of stemcells and embryonic stem cell • To learn propagation of embryonic stem cells, nuclear transfer technology, animal cloning and stem cell differentiation • To gain knowledge on stem cell plasticity, stem cell assay and protocols, stem cell separations and stem cell therapies <p>To learn stem cells and tissue engineering, human embryonic stem cells and society, intellectual property results</p>
9	ABT-Core-P-203	Molecular Biology & Immunology	2019	<ul style="list-style-type: none"> • Effect of UV radiation on bacterial growth • SDS PAGE • Electrophoresis • Blood grouping • Blood smear preparation • RBC count • Radial Immuno Diffusion • Neubauer chaber
10	ABT-Core-P-204	Animal Cell culture & Stem Cell Biology & Cell Biology	2019	<ul style="list-style-type: none"> • Laboratory safety rules and regulations • Animal handling and care • Preparation of cell culture media • Staining of animal cells • Preparation of cell lines • Culture of virus in chick embryo

11	ABT- CF-205	Cell Biology & Immunology (CB&IM)	2019	<ul style="list-style-type: none"> • Able to learn organization of prokaryotic and eukaryotic cell, Nucleus structure, Eukaryotic chromosome and polytene and lamp brush chromosomes • To learn mechanism of cell division, regulation of eukaryotic cellcycle, chromosomal abnormalities and tumor biology • To understand types of immunity, types of cell involved in immune response, structure and function of antibody and complimentarily cascade • To gain knowledge on Antigen presentation, hypersensitivity reactions, immune tolerance and immunopathology
12	ABT- EF-206	Human Values & Professional Ethics (HVPE)-II	2019	<ul style="list-style-type: none"> • To gain knowledge on value education • To learn medical ethics • To become proficient on business ethics • To understand environmental ethics and social ethics
13	ABT- Core-301	Enzymology (ENZ)	2019	<ul style="list-style-type: none"> • To understand enzyme specificity, enzyme catalysis and isolation and purification of enzymes • To gain knowledge on theories of enzymes kinetics, enzyme kinetics and its importance, effect of reactant concentrations and effect of temperature of pH and enzyme concentration reaction rate • To become proficient on clinical aspects of enzymology, immobilized enzymes, isoenzymes and enzyme engineering
14	ABT- Core-302	Animal Reproduction, Breeding & Transgenic Technology (ARBTT)	2019	<ul style="list-style-type: none"> • To become proficient on structure and function of male and female reproductive system; reproductive cycles and contraception in male and females • To gain skill on sex determination, selection for qualitative inherited characters, parental

				<p>determination and verification and progeny testing</p> <ul style="list-style-type: none"> • To understand artificial insemination techniques, in vitro fertilization, embryo transfer technology, microinjection and macroinjection • To learn transgenic technology development, generation of chimeric, transgenic and knockout mice
15	ABT-Core-P-303	Enzymology & Genetic Engineering	2019	<ul style="list-style-type: none"> • To determine the effect of substrate concentration, enzyme concentration and temperature on enzyme activity • Measures of central tendency • regression and correlation analysis • T-test
16	ABT-Core-P-304	Animal Reproduction, Breeding & Transgenic Technology & Environmental Biotechnology	2019	<ul style="list-style-type: none"> • To estimate the sperm motility, sperm count , sperm membrane integrity test and pH of semen. • Determination sperm viability • Retrieval of gene and protein sequence from gene and protein bank, redelivery
17	GE-305A	Cancer Biology	2019	<ul style="list-style-type: none"> • To gain knowledge on cancer types and tumor development • To learn oncogenes, mechanisms of onogene activation and chromosomal translocation • To understand cell cycle regulation and cancer, DNA Damage and repair • To learn tumor immunology, Vaccine development, tumor cell evasion of immune defenses
18	GE-305B	Animal Biotechnology & Industrial Applications	2019	<ul style="list-style-type: none"> • To gain knowledge on preservation animals engineered bacteria/yeast/ cell lines, metabolic engineering, fermentative production and glycolytic pathway • To understand monoclonal

				<p>antibodies production and genetically engineered products</p> <ul style="list-style-type: none"> To know the DBT guidelines, Global scenario of transgenic micro organisms and ethical issues related to biotechnology products
19	GE-305C	Biostatistics & Bioinformatics	2019	<ul style="list-style-type: none"> To understand prediction of protein structure and protein sequence database, prediction of gene structure, submission of sequence to database, phylogenetic analysis To learn biostatistics, measures of location and dispersion, curve fitting and correlation and regression To understand probability distribution, tests of significance, student t-test and F-test, chi square test and their application
20	OE-306A	Environmental Biotechnology (EBT)	2019	<ul style="list-style-type: none"> To gain knowledge on waste and pollutants, hazards from wastes and pollutants and hazards from chemicals in wastes Waste treatment, treatment of liquid wastes, treatment of solid waste and contributions of biotechnology to waste treatment will be understood To become proficient in aerobic waste water treatment and measurement of pollution levels To learn anaerobic treatment of waste water, biodegradation of xenobiotics compounds, hazards from xenobiotics and bioremediation
21	OE-306B	Genetic Engineering (GE)	2019	<ul style="list-style-type: none"> Use of enzymes in DNA and RNA synthesis, restriction enzymes and ligation and modification of DNA To learn vectors for constructions of genomic libraries, expression vectors, promoters

				<p>and vectors used for cloning</p> <ul style="list-style-type: none"> • To gain knowledge on DNA fragments, cDNA synthesis, PCR • To become proficient on ligation between cohesive and blunt end DNA fragments, introduction of cloned genes into host and expression of cloned genes
22	ABT- Core- 401	Medical Biotechnology (MBT)	2019	<ul style="list-style-type: none"> • To understand disease diagnosis, use of monoclonal antibodies in detection of genetic disease • To learn Disease treatment, interferons, growth factor, and antisense nucleotide as therapeutic agent • To gain knowledge on gene therapy, types of gene therapy, augmentation therapy and targeted transfer • To become proficient on forensic medicine, preparation of DNA sample. Approaches for DNA analysis and applications of forensic medicine
23	ABT- Core- 402	Fermentation Technology and Downstreaming Process (FTDSP)	2019	<ul style="list-style-type: none"> • To understand cell distribution methods, separation techniques, purification by chromatographic techniques and isolation and screening and maintenance of industrially importance microbes • To learn bioreactor design, fermentation economics, upstream processing, membrane based separations <p>To gain knowledge on importance of downstream processing economics of downstream processing</p>
24	ABT-Core- P-403& 404	Project and Viva- Voce	2019	<ul style="list-style-type: none"> • Students must perform project work which includes experiments related to Toxicology, Animal Tissue culture, Fermentation technology or any work related to biology.

				<p>After completion of project work students have to prepare dissertation by their own and submit to the committee members.</p> <ul style="list-style-type: none"> • Evaluation of dissertation will be conducted by committee members through Viva-Voce
25	GE-405A	Biosafety, Bio Ethics & Intellectual Property rights	2019	<ul style="list-style-type: none"> • To understand socio-economic and legal impact of biotechnology, use of genetically modified organisms, moral and ethical issues in biotechnology and safety issues with GMO • To learn intellectual property right, evaluation of patenting, application of GATT and IPR and WTO Act and global and Indian biodiversity • To gain knowledge on Indian Patent Act 1970, role of country patent office, U.S. Patent trademark office and U.S. Paten system Vs Indian Patent system • To gain knowledge on Ethics and genetic engineering, patent of genes, human cloning, stem cel, regulatory requirements for drugs and biologics, GLP and GMP
26	GE-405B	Drug design and Development	2019	<ul style="list-style-type: none"> • To learn drug design, analog approach of drug designing • To understand SAR Vs QSAR, Partition coefficient, Hammets substituent constant and Tafts steric constant, Free Wilson mode, 3D-QSAR approach like COMFA and COMIA • To gain knowledge on pharmacological screening and assays, pharmacological screening models for therapeutic areas, cell based assay, biochemical assay, radiological binding assay, small molecule manufacturing

				<ul style="list-style-type: none"> To learn Drug Laws, FDA, OECD, ICH, Schedule Y, drug registration, Regulations of human pharmaceuticals and biological products, and clinical trial design
27	GE-405C	Animal Cell Culture Techniques	2019	<ul style="list-style-type: none"> To understand Animal cell culture, culture medium, characteristics of cell in culture, measurement of viability and cytotoxicity , cell types and apoptosis To gain knowledge in scaling up of animal cell culture, cell transformation, tissue engineering, transgenic animals, animal cloning To become proficient in improvement of biomass, pharming products, plasminogen activator and ethical issues related to biotechnology products
28	OE-406A	Advanced Genomics and Proteomics	2019	<ul style="list-style-type: none"> To learn structure of Prokaryotic and Eukaryotic genomes, Isolation and purification of genomic DNA, Construction of Physical maps and Whole genome sequence alignment To understand genome annotation, methods for gene identification, functional genomics, transcript profiling To learn protein structure, sample preparation and separation 2D-analysis, Multidimensional liquid chromatography, protein-protein interactions analysis <p>To gain knowledge on DNA /protein sequence homologies, Gene duplication and</p>
29	OE-406B	Bio resource Technology (Apiculture, Sericulture , Aquaculture, Vermiculture)	2019	<ul style="list-style-type: none"> To understand Types of honey bees, life history of honey bees, management of apiculture and by products of honey bees and economic importance disease and their control To become proficient on fresh water fin fish

				culture, shell fish (prawn and Pearls) culture <ul style="list-style-type: none"> To understand historical background of vermicompost, methods of vermiculture and problems involved in vermicompost
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44. Business Management

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	MBA 101	Management And Organisational Behaviour	2019	Examine the Management concepts and functions. Apply the concepts of planning, decision making. Apply the concepts of delegation of authority, decentralisation and departmentation in real life situations. Analyse the controlling principles and practices, Ethics and corporate social responsibility. Evaluate the basic concepts of organizational conflicts and climate.
2	MBA 102	Managerial Communications	2019	Apply the basic concepts of communication for business correspondence. Distinguish different forms of communication. Evaluate different types of communication. Adapt report writing skills of different types on need basis. Acquire presentation skills along with the interview techniques.
3	MBA 103	Managerial Economics	2019	Describe the importance of managerial economics and its contribution to decision making in different types of business organizations by the managerial economist.

				<p>Apply the basic principles of managerial economics.</p> <p>Apply demand analysis concept in the real life business situations.</p> <p>Discuss the meaning and usefulness of the production function and cost function in analysing the firm's production activity.</p>
4	MBA 104	Accounting For Managers	2019	<p>Outline the basic knowledge of accounting, bookkeeping, accounting Principles, accounting cycle.</p> <p>Apply the concepts of journal, ledger and Trail balance.</p> <p>Identify the nature of expenditure and revenue for preparation of financial statements of business.</p> <p>Examine the role of accounting policies like depreciation.</p>
5	MBA 105	Quantitative Analysis For Management Decisions	2019	<p>Recall the fundamentals in Mathematics and Statistics.</p> <p>Demonstrate the methods to solve derivatives, progressions and gaming.</p> <p>Choose decision making in a competitive situation.</p> <p>Solve transportation Problem with minimum cost of transport of commodities.</p>
6	MBA 106	Information Technology For Managerial Applications	2019	<p>Identify various network topologies.</p> <p>Apply Various Mathematical & Statistical Operations Using MS office &MS-Excel.</p> <p>Create Effective basic power point Presentations</p>
7	MBA 107	Business Statistics	2019	<p>About the information needs, sources of data and measures of central tendency .</p>

				The concept of Scientific Research and the methods of conducting Scientific Enquiry. The Statistical Tools of Data Analysis.
8	MBA 108	Human Values And Professional Ethics	2019	About ethics, values and morals. The concepts of value based education and its relevance. Learn about environmental and social ethics
9	MBA 201	Marketing Management	2019	Outline the concepts of marketing. Create the segmentation, targeting and positioning in marketing. Analyse various phases of product life cycle. Evaluate various methods of pricing and identify the best pricing strategy. Evaluate marketing communication strategies.
10	MBA 202	Financial Management	2019	Outline the basic concepts of Financial Management. Comprehend the various methods of Investment Analysis and apply various techniques of capital budgeting. Adapt the concepts of leverage, capital structure and its effect on the long term survival of the firm. Appraise various methods of computation of cost of capital.
11	MBA 203	Human Resources Management	2019	Outline the functions and challenges of HRM. Apply different concepts of HR Planning, Recruitment, Selection, Training, Interviewing Techniques and Executive Development Programs. :Apply the uses of job analysis, job description, job specification, ergonomics in industry and the methods of job evaluation. Utilize the various methods of performance

				appraisal.
12	MBA 204	Production Management	2019	Apply the basic concepts of production and operations management and identify types of manufacturing processes. Define and explain concept of production planning and control. Identify effective plant location and plant layout. Design strategies to improve productivity.
13	MBA 205	Business Research Methods	2019	Adapt the fundamentals of Business research methodology. Identify research problem. Apply sample and census survey and measuring techniques. Design data collection techniques. Develop data processing procedures and apply tools. Draft thesis/report writing.
14	MBA 206	Management Information Systems	2019	Understand various types of information systems. Analyse the various functional information systems
15	MBA 207	Operation Research	2019	Understand various concepts and techniques of OR. Apply various OR techniques to improve the efficiency of the organisations.
16	MBA 208	Leadership Values	2019	Identify the leadership qualities to run an organization successfully. Appraise the various concepts of value based leadership.
17	MBA 301	Business Environment	2019	Outline the basic concepts of business environment and its components. Analyze the structure of Indian economy.

				Discuss the components of fiscal policy and balance of payments. Evaluate different trade related policies.
19	MBA 302	Entrepreneurship	2019	Understand the concept of entrepreneurship. Analyse entrepreneurship development programs in India and contents for training for entrepreneurial competencies. Develop Creativity in entrepreneurship. Design the project reports & make project evaluation
20	MBA 311	Consumer Behaviour	2019	Evaluate the consumer behaviour and business strategies. Apply the various consumer behaviour models. Build the psychological process and develop the effective strategy in terms of impact on consumer behaviour.
21	MBA 312	Customer Relationship Management	2019	Develop the concepts of CRM and strategies in business. Appraise the customer profile and perception of customer behavior in relationship perspectives. Analyse strategies for customer acquisition, models of CRM.
22	MBA 313	Marketing Research And Information Systems	2019	Understand basic concepts of research and methodology of conducting researches in marketing domain. <ul style="list-style-type: none"> • Pursue the summer training/ project work and a winter project work and a professional career in Marketing Research domain.
23	MBA 314	Advertising And Sales Promotion Management	2019	Discuss the basic concepts of advertising for better understanding the challenges and opportunities in advertising . Analyse the relations of advertising with

				<p>segmentation and budget decision .</p> <p>Design better advertising strategies for the company .</p> <p>Identify media options which are suitable for the company for better promotion .</p> <p>Develop an effective advertising campaign for the company .</p>
24	MBA 315	Product And Brand Management	2019	<p>Discuss the importance of brand image in marketing .</p> <p>Formulate brand vision which communicates better the organisations’ policy on Branding .</p> <p>Analyse brand promotion methods in brand communication .</p> <p>Analyse factors influencing brand extension decisions .</p> <p>Design brand marketing programmes and for better brand performance .</p>
25	MBA 316	Digital Marketing	2019	<p>Get knowledge regarding basic concepts of Digital Marketing.</p> <p>Analyse and Choose different channels of digital marketing according to the changing requirements of the markets</p> <p>Construct different digital marketing plans on situational basis.</p> <p>Manage digital by conducting a marketing research and adapt the changes by creating new goals for further reputation.</p>
26	MBA 321	Financial Services	2019	<p>Have awareness on insurance industry & its regulations.</p> <p>Create awareness on different financial services.</p>
27	MBA 322	Investment Management	2019	<p>Analyse various investment alternatives for effective investment decision .</p> <p>Discuss the importance of security analysis in</p>

				<p>investment decision process .</p> <p>Design bond management strategies to realise good return on bond investment .</p> <p>Apply different equity valuation methods for the valuation of securities .</p> <p>Construct optimal portfolio for higher return at lower risk .</p> <p>Analyse different schemes of mutual funds for better investment decision .</p>
28	MBA 323	Business Taxation	2019	<p>Conclude the fundamentals of Taxation .</p> <p>Discuss taxation methods of companies and individuals .</p> <p>Analyse income sources from business through taxation .</p> <p>Evaluate Tax management strategies</p>
29	MBA 402	Strategic Management	2019	<p>Develop vision, mission and objectives of the organization.</p> <p>Analyse industry and develop techniques of competitive analysis.</p> <p>Appraise strategic leadership styles and actions.</p> <p>Formulate effective strategies in business.</p> <p>Develop a frame work for the implementation strategies in business.</p> <p>Evaluate the strategy controls by measuring performance of organization.</p>
30	MBA 403	Business Laws And Ethics	2019	<p>Analyze the Indian Contract Act.</p> <p>Evaluate Sales of Goods Act and the machinery for redressal of consumer grievances.</p> <p>Elaborate rights and duties of agent and principal, Principal's liability for the acts of agent and the procedure for termination of agency.</p>

				Examine the rights and duties of partners, dissolution of partnership firm.
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46. Computer Science

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MCA 101	Discrete Mathematical Structures	2019	<ol style="list-style-type: none"> 1. The students become familiar with the Sampling Distributions like with replacement and without replacement 2. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it. 3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution
2	MCA 102	Object Oriented Programming with Java	2019	<ol style="list-style-type: none"> 1. Solve and Implement solution for the problem using java basic elements like variables, control structures. 2. Handle Object Oriented Concepts effectively in the real time problems. 3. Understand the architecture and working procedure of platform independent language JAVA SDK.
3	MCA 103	Computer Organization	2019	<ol style="list-style-type: none"> 1. To gain knowledge about the Micro Processors. 2. To study the hierarchical memory system including cache memories and virtual

				memory.
4	MCA 104	Operating Systems	2019	<ol style="list-style-type: none"> 1. Learn evaluation of different types Operating System and their functionalities. 2. Learn Internal structure and the function procedure of Operating system in detail.
5	MCA 105	105A.Accounting and Financial management 105B.Accounting Essentials for Computer Applications	2019	<ol style="list-style-type: none"> 1. Use of Accounting information to managers with in the organization. 2. Informs the business decision & control the Management Functions.
6.	MCA 106 P	Software Lab I (based on 101 & 103)	2019	<ol style="list-style-type: none"> 1. The students become familiar with the Sampling Distributions like with replacement and without replacement 2. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it. 3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution. 4. To gain knowledge about the Micro Processors. 5. To study the hierarchical memory system including cache memories and virtual memory
7.	MCA 107 P	Object Oriented Programming Lab	2019	<ol style="list-style-type: none"> 1. Solve and Implement solution for the problem using java basic elements like variables, control structures. 2. Handle Object Oriented Concepts effectively in the real time problems. 3. Understand the architecture and working

				procedure of platform independent language JAVA SDK.
8.	MCA 108P	Operating Systems Lab	2019	<ol style="list-style-type: none"> 1. Learn evaluation of different types Operating System and their functionalities. 2. Learn Internal structure and the function procedure of Operating system in detail.
9.	MCA 201	Computer Oriented Operations Research	2019	<ol style="list-style-type: none"> 1. solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities. 2. formulate and solve problems as networks and graphs and set up decision models and use some solution methods for nonlinear optimization problems. 3. analyse the general nonlinear programming problems. 4. formulate the nonlinear programming models.
10.	MCA 202	Data Structures using Java	2019	<ol style="list-style-type: none"> 1. Develop a program a structured Programming Using JAVA. 2. Develop a Memory Handling work & Sequential Data file handling. 3. Maintain data using proper data organizing structures.
11	MCA 203	Data Communication and Computer Networks	2019	<ol style="list-style-type: none"> 1. Understand the Network Terminologies and the components used to build networks. 2. Understand Network Models (Topologies) to establish networked systems. 3. Understand the internal architecture, working procedure of OSI Layer and

				Protocols.
12	MCA 204	Advanced Database Management Systems	2019	<ol style="list-style-type: none"> 1. Students will get an attempt to provide with the advanced information about ADBMS and their development. 2. This Subject also provides the conceptual background necessary to design and develop distributed database System for real life applications and also helps to learn Query optimization, centralized query optimization, Distributed query optimization algorithms. 3. How SQL Programs are implemented as a series of primitive operations and how DDBs are implemented and how applications are design for those DDB
13	MCA 205	205A. E-Commerce	2019	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems. 3. Understand the processes of developing and implementing information systems and be aware of the ethical, social, and security issues of information systems;
14		205B. Cyber Security	2019	<ol style="list-style-type: none"> 1. Analyze and evaluate the cyber security needs of an organization and determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation. 2. Measure the performance and troubleshoot cyber security systems and implement cyber security solutions and use of cyber security, information

				<p>assurance, and cyber/computer forensics software/tools.</p> <p>3. Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators, Design and develop a security architecture for an organization and design operational and strategic cyber security strategies and policies.</p>
15		205C. Neural Networks	2019	<p>1. Define what is Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network.</p> <p>2. Analyze ANN learning, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning and Boltzmann learning.</p> <p>3. Implement Simple perception, Perception learning algorithm, Modified Perception learning algorithm, and Adaptive linear combiner, Continuous perception, learning in continuous perception.</p>
16	MCA 301	Software Engineering	2019	<p>1. Develop a system in a systematic way by using various Prescriptive Process models like Waterfall and SDLC.</p> <p>2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance</p>

				<p>and quality requirements.</p> <p>3. Analyze and translate a specification into a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse</p>
17	MCA 302	Computer Graphics	2019	<p>1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.</p> <p>2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis and Use of geometric transformations on graphics objects and their application in composite form.</p> <p>3. Extract scene with different clipping methods and its transformation to graphics display device, Explore projections and visible surface detection techniques for display of 3D scene on 2D screen and Render projected objects to naturalize the scene in 2D view and use of illumination models for this.</p>
18	MCA 303	Web Technologies	2019	<p>1. Explain the history of the internet and related internet concepts that are vital in understanding web development.</p> <p>2. Discuss the insights of internet programming and implement complete application over the web and students can Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading</p>

				<p>Style sheet.</p> <p>3. Utilize the concepts of JavaScript and Java, Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.</p>
19	MCA 304	304A.Data warehousing and Data mining	2019	<ol style="list-style-type: none"> 1. To identify the scope and essentiality of Data Warehousing and Mining and to analyze data, choose relevant models and algorithms for respective applications. 2. To study spatial and web data mining. 3. Students develop research interest towards advances in data mining.
20		304B.Big Data Analytics	2019	<ol style="list-style-type: none"> 1. Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. 2. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. 3. Students Interpret business models and scientific computing paradigms, and apply software tools for big data analytics and achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications
21		304C System Programming	2019	<ol style="list-style-type: none"> 1. Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems).

				<ol style="list-style-type: none"> 2. Ability to use theoretical and applied information in these areas to design system software with realistic constraints. 3. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language programming and Unix shell programming.
22	MCA 305	305A. Cryptography and Network Security	2019	<ol style="list-style-type: none"> 1. Provide security of the data over the network and do research in the emerging areas of cryptography and network security. 2. Implement various networking protocols. 3. Protect any network from the threats in the world
23		305B. Artificial Intelligence	2019	<ol style="list-style-type: none"> 1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations and Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning. 2. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models. 3. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool, Demonstrate proficiency in applying scientific method to models of machine learning and

				Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.
24		305C.Mobile Application Development	2019	<ol style="list-style-type: none"> 1. Identify various concepts of mobile programming that make it unique from programming for other platforms, Critique mobile applications on their design pros and cons. 2. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, 3. Program mobile applications for the Android operating system that use basic and advanced phone features, and deploy applications to the Android marketplace for distribution.
25	MCA 401	401A.Cloud Computing	2019	<ol style="list-style-type: none"> 1. Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. 2. Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient. 3. Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model.

				4. Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS.
26		401B. Dot Net Technologies	2019	<ol style="list-style-type: none"> 1. To explore .NET technologies for designing and developing dynamic, interactive and responsive web applications. 2. Provide a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but webdistributed, or executed remotely. 3. Make the developer experience consistent across widely varying types of apps, such as Windowsbased apps and Web-based apps.
27		401C. Software Testing	2019	<ol style="list-style-type: none"> 1. List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects. 2. Distinguish characteristics of structural testing methods and demonstrate the integration testing which aims to uncover interaction and compatibility problems as early as possible. 3. Discuss about the functional and system testing methods and demonstrate various issues for object oriented testing.
28	MCA 402	402A. Essentials of Data Science	2019	<ol style="list-style-type: none"> 1. Having a clear understanding of the subject related concepts and contemporary issues. 2. Having problem-solving ability- to assess

				<p>social issues and engineering problems.</p> <ol style="list-style-type: none"> 3. Having a clear understanding of professional and ethical responsibility. 4. Having cross-cultural competency exhibited by working as a member or in teams. And having a good working knowledge of communicating in English – communication with the engineering community and society
29		402B.Deep Learning	2019	<ol style="list-style-type: none"> 1. Understand the role of deep learning in machine learning applications and get familiar with the use of TensorFlow/Keras in deep learning applications. 2. Compare Various deep learning Algorithms used for Classification Segmentation and detection. 3. Apply various concepts related with Deep Learning to solve Problems. Analyse different deep learning models in Image related projects.
30		402C.Internet of Things	2019	<ol style="list-style-type: none"> 1. Able to understand the application areas of IOT. 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. 3. Able to understand building blocks of Internet of Things and characteristics.
31	MCA 403	Major Project Work	2019	

M.Sc (CS) : Master of Computer Science

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MSCS -101C	Computer Organization	2019	<ol style="list-style-type: none"> 1. To gain knowledge about the Micro Processors. 2. To study the hierarchical memory system including cache memories and virtual memory.
2	MSCS -102C	Programming in Java & Data Structures	2019	<ol style="list-style-type: none"> 1. Develop a program a structured Programming Using JAVA. 2. Develop a Memory Handling work & Sequential Data file handling. 3. Maintain data using proper data organizing structures.
3	MSCS -103C	Operating Systems	2019	<ol style="list-style-type: none"> 1. Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,. 2. Analyze important algorithms eg. Process scheduling and memory management algorithms. 3. Categorize the operating system's resource management techniques, dead lock management techniques, memory management techniques. 4. Demonstrate the ability to perform OS tasks in Red Hat Linux Enterprise.
4	MSCS – 104 GE – A	Mathematical Foundations For Computer Science	2019	<ol style="list-style-type: none"> 1. Ability to apply mathematical logic to solve problems. 2. Understand sets, relations, functions, and discrete structures. 3. Able to use logical notation to define and reason about fundamental mathematical

				<p>concepts such as sets, relations, and functions.</p> <ol style="list-style-type: none"> 4. Able to formulate problems and solve recurrence relations. 5. Able to model and solve real-world problems using graphs and trees.
5	MSCS – 104 GE - B	Computer Oriented Operational Research	2019	<ol style="list-style-type: none"> 1. Solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities. 2. Formulate and solve problems as networks and graphs and set up decision models and use some solution methods for nonlinear optimization problems. 3. Analyse the general nonlinear programming problems. 4. Formulate the nonlinear programming models.
6	MSCS - 05CF	Environmental Studies	2019	<ol style="list-style-type: none"> 1. Articulate the interconnected and interdisciplinary nature of environmental studies. 2. Demonstrate an integrative approach to environmental issues with a focus on sustainability. 3. Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences, and humanities in environmental problem solving. 4. Communicate complex environmental information to both technical and non-technical audiences. 5. Understand and evaluate the global scale

				of environmental problems and reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.
7	MSCS - 106EF	1. A. PC HardwareBasics	2019	<ol style="list-style-type: none"> 2. Identify the hardware components of a computer. Lists the hardware components such as processor, memory, disk, main board, etc. 3. Explains the features of the hardware components of a computer. Explains the relationships between the components of a computer and how data are transferred among the components. 4. identify the peripheral devices outside computer. Uses computer using input devices, such as keyboard and mouse. 5. Transfers data outside the computer using output devices, such as screen and printer. Saves files to removable devices and loads files from removable devices. 6. Connects to the Internet using network cards. identify the software's running on a computer. Identifies BIOS and changes settings in BIOS.
8	MSCS - 106EF	B. Statistical Methods	2019	<ol style="list-style-type: none"> 1. Calculate and interpret the correlation between two variables. Calculate the simple linear regression equation for a set of data. 2. Employee the principles of linear regression and correlation, including least square method, predicting a particular value of Y for a given value of X and

				<p>significance of the correlation coefficient.</p> <ol style="list-style-type: none"> 3. Know the association between the attributes. Know the construction of point and interval estimators. 4. Evaluate the properties of estimators. Demonstrate understanding of the theory of maximum likelihood estimation.
9	MSCS -201C	Advanced Data Base Management System	2019	<ol style="list-style-type: none"> 1. Explain and evaluate the fundamental theories for advanced database architectures and query operators. 2. Design and implement parallel database systems with evaluating different methods of storing, managing of parallel database. 3. Assess and apply database functions of distributed database. Evaluate different database designs and architecture. 4. Administer and analyze database with query optimization techniques and develop Web interface with database. 5. Understand advanced querying and decision support system.
10	MSCS -202C	Computer Networks	2019	<ol style="list-style-type: none"> 1. Describe the general principles of data communication. Describe how computer networks are organized with the concept of layered approach. 2. Describe how signals are used to transfer data between nodes. Implement a simple LAN with hubs, bridges and switches. 3. Describe how packets in the Internet are delivered. Analyze the contents in a given data link layer packet, based on the layer concept.

				<ol style="list-style-type: none"> 4. Design logical sub-address blocks with a given address block. Decide routing entries given a simple example of network topology. 5. Describe what classless addressing scheme and how routing protocols work.
11	MSCS -203C	Computer Graphics	2019	<ol style="list-style-type: none"> 1. The course introduces the basic concepts of computer graphics. It provides the necessary theoretical background and demonstrates the application of computer science to graphics. The course further allows students to develop programming skills in computer graphics through programming assignments. 2. Understands the core concepts and mathematical foundations of computer graphics knows fundamental computer graphics algorithms and data structures. 3. Has an overview of different modeling approaches and methods and has detailed knowledge about basic shading and texture mapping techniques. 4. Understands light interaction with 3D scenes.
12	MSCS- 204 GE – A	E- Commerce	2019	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems. Understand the processes of developing and implementing information systems. 3. Be aware of the ethical, social, and security issues of information systems;

13	MSCS- 204 GE B	Accounting And Financial Management	2019	<ol style="list-style-type: none"> 1. Use of Accounting information to managers within the organization. 2. Informs the business decision & control the Management Functions.
14	MSCS- 205CF	Human Rights And Value Education	2019	<ol style="list-style-type: none"> 1. understand the historical growth of the idea of human rights. 2. demonstrate an awareness of the international context of human rights. 3. demonstrate an awareness of the position of human rights in the UK prior to 1998. 4. understand the importance of the Human Rights Act 1998, analyse and evaluate concepts and ideas.
15	MSCS- 206 EF A	Principles Of Management	2019	<ol style="list-style-type: none"> 1. Understand the concepts related to Business. 2. Demonstrate the roles, skills and functions of management. 3. Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions. 4. Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
16	MSCS- 206 EF B	Internet Of Things	2019	<ol style="list-style-type: none"> 1. Able to understand the application areas of IOT. 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. 3. Able to understand building blocks of Internet of Things and characteristics.
17	MSCS-301C	Data Warehousing and Data Mining	2019	<ol style="list-style-type: none"> 1. Understand the functionality of the

				<p>various data mining and data warehousing component.</p> <ol style="list-style-type: none"> 2. Appreciate the strengths and limitations of various data mining and data warehousing models. 3. Explain the analyzing techniques of various data. 4. Describe different methodologies used in data mining and data warehousing. 5. Compare different approaches of data warehousing and data mining with various technologies.
18	MSCS-302C	Web Technologies	2019	<ol style="list-style-type: none"> 1. Analyze a web page and identify its elements and attributes. 2. Create web pages using XHTML and Cascading Style Sheets. 3. Build dynamic web pages using JavaScript (Client side programming). Create XML documents and Schemas. 4. Build interactive web applications using AJAX.
19	MSCS-303C	Software Engineering	2019	<ol style="list-style-type: none"> 1. Develop a system in a systematic way by using various Prescriptive Process models like Waterfall and SDLC. 2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements.

				<ol style="list-style-type: none"> Analyze and translate a specification into a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse
20	MSCS -304-GE-A	Systems Programming	2019	<ol style="list-style-type: none"> Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems). Ability to use theoretical and applied information in these areas to design system software with realistic constraints. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language programming and Unix shell programming. Ability to devise, select, and use modern techniques and tools needed for the design and implementation of system programs.
21	MSCS -304-GE-B	Computer Algorithms	2019	<ol style="list-style-type: none"> Apply design principles and concepts to algorithm design (c) Have the mathematical foundation in analysis of algorithms (a, j) Understand different algorithmic design strategies (j) Analyze the efficiency of algorithms using time and space complexity theory (b)

22	MSCS -304-GE-C	UID Using .NetTechnologies	2019	<ol style="list-style-type: none"> 1. Provide a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but web distributed, or executed remotely. 2. Build all communication on industry standards to ensure that code based on .NET Framework integrates with any other code. 3. Building multi-tier enterprise applications. 4. Client-side programming: HTTP, CGI, Cookies, JavaScript, HTML, XML.
23	MSCS -304-GE-D	IT in Forensic Science	2019	<ol style="list-style-type: none"> 1. Approach analysis of evidence without bias. 2. Develop a conceptual understanding of criminal justice system, rules of evidence, legal system. 3. develop professional, ethical graduates whose competence in problem-solving, legal analysis and application, quantitative reasoning, investigation and scientific laboratory procedures can be applied to immediate employment or advanced study.
24	MSCS -304-GE-E	Software Testing	2019	<ol style="list-style-type: none"> 1. Various test processes and continuous quality improvement, Types of errors and fault models. 2. Methods of test generation from requirements. 3. Behavior modeling using UML: Finite state machines (FSM), Test generation from FSM models, Input space modeling

				<p>using combinatorial designs.</p> <ol style="list-style-type: none"> 4. Combinatorial test generation, Test adequacy assessment using: control flow, data flow, and program mutations, The use of various test tools. 5. Application of software testing techniques in commercial environments.
25	MSCS -305 GE-A	Cloud Computing	2019	<ol style="list-style-type: none"> 1. Understand the concepts, characteristics, delivery models and benefits of cloud computing 2. Understand the key security and compliance challenges of cloud computing 3. Understand the key technical and organisational challenges 4. Understand the different characteristics of public, private and hybrid cloud deployment models.
26	MSCS -305 GE-B	Big Data Analytics	2019	<ol style="list-style-type: none"> 1. Understand Big Data and its analytics in the real world, Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics. 2. Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm, Design and Implementation of Big Data Analytics using pig and spark to solve data intensive problems and to generate analytics. 3. Implement Big Data Activities using Hive.
27	MSCS -305 GE-C	Artificial NeuralNetworks	2019	<ol style="list-style-type: none"> 1. Know the main provisions neuro mathematics, Know the main types

				<p>of neural networks;</p> <ol style="list-style-type: none"> 2. Know and apply the methods of training neural networks; 3. Know the application of artificial neural networks; 4. To be able to formalize the problem, to solve it by using a neural network.
28	MSCS -305 GE-D	Cyber Security	2019	<ol style="list-style-type: none"> 1. Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure. 2. Design, develop, test and evaluate secure software. 3. Develop policies and procedures to manage enterprise security risks. 4. Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training. 5. Interpret and forensically investigate security incidents.
29	MSCS -305 GE-E	Mobile App Development	2019	<ol style="list-style-type: none"> 1. Describe those aspects of mobile programming that make it unique from programming for other platforms, 2. Critique mobile applications on their design pros and cons, 3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, 4. Program mobile applications for the Android operating system that use basic and advanced phone features, and 5. Deploy applications to the Android marketplace for distribution.

47. Commerce

Commerce (R)

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Accounting Standards & Reporting	2019	<ul style="list-style-type: none"> i. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation ii. Impart the ability to find out the cash flows and provide the skills to value goodwill iii. Create awareness about IFRS and segment reporting
2	102.	Financial Management	2019	<ul style="list-style-type: none"> i. Describe meaning, functions and objectives; role of financial manager. ii. Examine investment decision, capital budgeting, techniques of CB and methods of CB. iii. Investigate management of working capital, needs and concepts. iv. Asses financing decision, capital structure and capital theories. v. Design dividend decision and theories of dividend.
3	103.	Business Environment and Policy	2019	<ul style="list-style-type: none"> i. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment. ii. Illustrates economic environment nature and scope and new economic policy.

				<ul style="list-style-type: none"> iii. Develop political, legal environment; reasons for state intervention and government business interface. iv. Study the socio cultural environment nature, impact of social responsibility and business ethics. v. Interpret global environment; benefits and problems of MNCs and WTO.
4	104.	Organisational Behaviour	2019	<ul style="list-style-type: none"> i. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation ii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts. iii. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.
5	105a	Quantitative Techniques for Business Decisions	2019	<ul style="list-style-type: none"> i. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions. ii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions. iii. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.
7	201	Advanced cost Accounting	2019	<ul style="list-style-type: none"> i. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting; ii. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits. iii. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation

				<p>of various functional budgets.</p> <p>iv. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial Markets and Services	2019	<p>i. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market.</p> <p>ii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>iii. Create plans and understand the metrics for getting finance from venture capital firms.</p>
9	203.	Strategic Financial Management	2019	<p>i. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>ii. Explain Strategic financial management success factors and constraints.</p> <p>iii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>iv. Identify financial distress and restructuring; countering financial distress.</p> <p>v. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2019	<p>i. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>ii. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>iii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>iv. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205a	Working Capital	2019	<p>i. To impart basic knowledge on working capital concepts and source of WCand</p>

		Management		<p>to provide the skills to estimate working capital</p> <ul style="list-style-type: none"> ii. To enables the students familiarise with the cash management techniques and comprehend the concept of receivables and its management. iii. To provide the skills of inventory management with different techniques.
12	206a	e-Banking Operations	2019	<ul style="list-style-type: none"> i. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India. ii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits o e-banking applications. iii. Categorize the financial frauds in e-banking sector.
13	301	Security Analysis and Portfolio Management	2019	<ul style="list-style-type: none"> i. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models. ii. Illustrate portfolio theory, CAPM, SMLand APT models and investigate portfolio evaluation; sharpe's, treynor's and Jensen's performance index. iii. Synthesize portfolio revision, need and strategies.
14	302.	Accounting for Managerial Decisions	2019	<ul style="list-style-type: none"> i. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing. ii. Study the concept of Responsibility Accounting and its uses and trends. iii. Know the essential parameters for evaluation of divisional performance and the emerging issues today iv. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.

15	303a	Tally with GST Application	2019	<ul style="list-style-type: none"> i. To acquaint oneself with skills to prepare financial statements through Tally ERP. ii. To understand basics of GST system and to know steps involved in generating GSTR reports. iii. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.
16	303c	Tax planning & Management	2019	<ul style="list-style-type: none"> i. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads ii. Acquire the knowledge on tax planning with regard to location iii. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.
18	305a	Fundamentals of Accounting	2019	<ul style="list-style-type: none"> i. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts ii. To help the students to acquire the skills of financial statement analysis iii. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.
19	401	Financial Derivatives	2019	<ul style="list-style-type: none"> i. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions. ii. Prioritise options in financial derivatives and option pricing models. iii. Compose swap market futures, types and interest rate; pricing swaps. iv. Synthesize stock index futures, options and trading of stock futures and options.
20	402.	Project Planning & Control	2019	<ul style="list-style-type: none"> i. Define a project and operations of corporate long range planning and phases of capital budgeting. ii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.

				<ul style="list-style-type: none"> iii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project. iv. Understand Social cost benefit analysis and methods of SCBA v. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.
21	403a	Insurance Management	2019	<ul style="list-style-type: none"> i. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector. ii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance. iii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon. iv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement. v. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.
23	405a	Security Market Operations	2019	<ul style="list-style-type: none"> i. Learn the basic concepts of Indian securities market. ii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE. iii. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensx and NSE indices.

M.Com (A&F)

S. No	Course	Title of the Course	Years of Introductio	Course Outcomes
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.	Code		n	
1	101	Accounting Standards & Reporting	2019	<ul style="list-style-type: none"> iv. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation v. Impart the ability to find out the cash flows and provide the skills to value goodwill vi. Create awareness about IFRS and segment reporting
2	102.	Financial Management	2019	<ul style="list-style-type: none"> vi. Describe meaning, functions and objectives; role of financial manager. vii. Examine investment decision, capital budgeting, techniques of CB and methods of CB. viii. Investigate management of working capital, needs and concepts. ix. Asses financing decision, capital structure and capital theories. x. Design dividend decision and theories of dividend.
3	103.	Business Environment and Policy	2019	<ul style="list-style-type: none"> vi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment. vii. Illustrates economic environment nature and scope and new economic policy. viii. Develop political, legal environment; reasons for state intervention and government business interface. ix. Study the socio cultural environment nature, impact of social responsibility and business ethics. x. Interpret global environment; benefits and problems of MNCs and WTO.
4	104.	Organisational Behaviour	2019	<ul style="list-style-type: none"> iv. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation v. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts. vi. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.

5	105a	Quantitative Techniques for Business Decisions	2019	<ul style="list-style-type: none"> iv. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions. v. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions. vi. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.
7	201	Advanced cost Accounting	2019	<ul style="list-style-type: none"> v. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting; vi. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits. vii. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets. viii. Perceive the significance of ABC in cost ascertainment and control.
8	202.	Financial Markets and Services	2019	<ul style="list-style-type: none"> iv. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market. v. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market. vi. Create plans and understand the metrics for getting finance from venture capital firms.
9	203.	Strategic Financial Management	2019	<ul style="list-style-type: none"> vi. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics, vii. Explain Strategic financial management success factors and constraints.

				<p>viii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>ix. Identify financial distress and restructuring; countering financial distress.</p> <p>x. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2019	<p>v. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>vi. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>vii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>viii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205a	Working Capital Management	2019	<p>iv. To impart basic knowledge on working capital concepts and source of WCand to provide the skills to estimate working capital</p> <p>v. To enables the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>vi. To provide the skills of inventory management with different techniques.</p>
12	206a	e-Banking Operations	2019	<p>iv. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercials banks in India.</p> <p>v. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits o e-banking applications.</p> <p>vi. Categorize the financial frauds in e-banking sector.</p>

13	301	Security Analysis and Portfolio Management	2019	<ul style="list-style-type: none"> iv. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models. v. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; sharpe's, treynor's and Jensen's performance index. vi. Synthesize portfolio revision, need and strategies.
14	302.	Accounting for Managerial Decisions	2019	<ul style="list-style-type: none"> v. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing. vi. Study the concept of Responsibility Accounting and its uses and trends. vii. Know the essential parameters for evaluation of divisional performance and the emerging issues today viii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.
15	303a .	Tally with GST Application	2019	<ul style="list-style-type: none"> iv. To acquaint oneself with skills to prepare financial statements through Tally ERP. v. To understand basics of GST system and to know steps involved in generating GSTR reports. vi. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.
16	303c .	Tax planning & Management	2019	<ul style="list-style-type: none"> iv. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads v. Acquire the knowledge on tax planning with regard to location vi. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.

18	305a	Fundamentals of Accounting	2019	<ul style="list-style-type: none"> iv. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts v. To help the students to acquire the skills of financial statement analysis vi. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.
19	401	Financial Derivatives	2019	<ul style="list-style-type: none"> v. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions. vi. Prioritise options in financial derivatives and option pricing models. vii. Compose swap market futures, types and interest rate; pricing swaps. viii. Synthesize stock index futures, options and trading of stock futures and options.
20	402.	Project Planning & Control	2019	<ul style="list-style-type: none"> vi. Define a project and operations of corporate long range planning and phases of capital budgeting. vii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting. viii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project. ix. Understand Social cost benefit analysis and methods of SCBA x. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.
21	403a	Insurance Management	2019	<ul style="list-style-type: none"> vi. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector. vii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance. viii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon. ix. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim

				settlement. x. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.
23	405a	Security Market Operations	2019	iv. Learn the basic concepts of Indian securities market. v. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE. vi. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.

M.Com (FM)

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship /Skill development
1	101	Accounting Standards & Reporting	2019	vii. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation viii. Impart the ability to find out the cash flows and provide the skills to value goodwill ix. Create awareness about IFRS and segment reporting
2	102.	Financial Management	2019	xi. Describe meaning, functions and objectives; role of financial manager. xii. Examine investment decision, capital budgeting, techniques of CB and methods of CB. xiii. Investigate management of working capital, needs and concepts. xiv. Asses financing decision, capital structure and capital theories. xv. Design dividend decision and theories of dividend.
3	103.	Business Environment	2019	xi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment.

		and Policy		<p>xii. Illustrates economic environment nature and scope and new economic policy.</p> <p>xiii. Develop political, legal environment; reasons for state intervention and government business interface.</p> <p>xiv. Study the socio cultural environment nature, impact of social responsibility and business ethics.</p> <p>xv. Interpret global environment; benefits and problems of MNCs and WTO.</p>
4	104.	Organisational Behaviour	2019	<p>vii. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation</p> <p>viii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts.</p> <p>ix. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.</p>
5	105a	Quantitative Techniques for Business Decisions	2019	<p>vii. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions.</p> <p>viii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions.</p> <p>ix. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.</p>
7	201	Advanced cost Accounting	2019	<p>ix. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting;</p> <p>x. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits.</p> <p>xi. Know the concept of equivalent production and accounting treatment for</p>

				<p>joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets.</p> <p>xii. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial Markets and Services	2019	<p>vii. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market.</p> <p>viii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>ix. Create plans and understand the metrics for getting finance from venture capital firms.</p>
9	203.	Strategic Financial Management	2019	<p>xi. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>xii. Explain Strategic financial management success factors and constraints.</p> <p>xiii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>xiv. Identify financial distress and restructuring; countering financial distress.</p> <p>xv. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2019	<p>ix. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>x. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>xi. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>xii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>

11	205a	Working Capital Management	2019	<p>vii. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>viii. To enable the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>ix. To provide the skills of inventory management with different techniques.</p>
12	206a	e-Banking Operations	2019	<p>vii. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>viii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>ix. Categorize the financial frauds in e-banking sector.</p>
13	301	Security Analysis and Portfolio Management	2019	<p>vii. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models.</p> <p>viii. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index.</p> <p>ix. Synthesize portfolio revision, need and strategies.</p>
14	302.	Accounting for Managerial Decisions	2019	<p>ix. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing.</p> <p>x. Study the concept of Responsibility Accounting and its uses and trends.</p> <p>xi. Know the essential parameters for evaluation of divisional performance and</p>

				<p>the emerging issues today</p> <p>xii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.</p>
15	303a	Tally with GST Application	2019	<p>vii. To acquaint oneself with skills to prepare financial statements through Tally ERP.</p> <p>viii. To understand basics of GST system and to know steps involved in generating GSTR reports.</p> <p>ix. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.</p>
16	303c	Tax planning & Management	2019	<p>vii. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads</p> <p>viii. Acquire the knowledge on tax planning with regard to location</p> <p>ix. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.</p>
18	305a	Fundamentals of Accounting	2019	<p>vii. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts</p> <p>viii. To help the students to acquire the skills of financial statement analysis</p> <p>ix. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.</p>
19	401	Financial Derivatives	2019	<p>ix. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions.</p> <p>x. Prioritise options in financial derivatives and option pricing models.</p> <p>xi. Compose swap market futures, types and interest rate; pricing swaps.</p> <p>xii. Synthesize stock index futures, options and trading of stock futures and options.</p>

20	402.	Project Planning & Control	2019	<p>xi. Define a project and operations of corporate long range planning and phases of capital budgeting.</p> <p>xii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>xiii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>xiv. Understand Social cost benefit analysis and methods of SCBA</p> <p>xv. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403a	Insurance Management	2019	<p>xi. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>xii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>xiii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon.</p> <p>xiv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>xv. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
23	405a	Security Market Operations	2019	<p>vii. Learn the basic concepts of Indian securities market.</p> <p>viii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>ix. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>

48. B.Pharmacy

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	BP101T	Human Anatomy and Physiology I– Theory	2019	<ol style="list-style-type: none"> 1. Know the fundamental knowledge on the structure and functions of the various systems of the human body. 2. understanding all the homeostatic mechanisms of the body 3. Understand the relationship of anatomy with various disciplines of pharmacy. 4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition
2	BP102T	Pharmaceutical Analysis I–Theory	2019	<ol style="list-style-type: none"> 1. It gives knowledge about the fundamental methodology to prepare different strength of solutions. 2. It facilitate the students to predict the sources of mistakes and errors. 3. It also helps to develop the fundamentals of volumetric analytical skills. 4. It provides the basic knowledge in the principles of electrochemical analytical techniques The student will be provided with the skills to improve by the course content in

				terms of analytical techniques to perform the estimation of different category drugs.
3	BP104T	Pharmaceutical Inorganic Chemistry– Theory	2019	<ol style="list-style-type: none"> 1. To understand the history and concept of pharmacopoeia and its editions. 2. Knowledge about the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals. 3. Identification of limit tests of different pharmaceutical inorganic compounds. 4. To understand the method to prepare inorganic pharmaceuticals. 5. To justify the medicinal importance of acidifiers, antacids, cathartics and antimicrobial agents as gastrointestinal agents. 6. To discuss the handling and applications of radiopharmaceuticals
4	BP105T	Communication skills– Theory	2019	<ol style="list-style-type: none"> 1. To equip students with Pre-presentations and to understand the structure of a good presentation and devise various techniques for delivering a successful presentation. 2. To help students overcome stage fear and

				<p>take questions.</p> <p>3. To enable the students to become global citizens.</p> <p>4. This course will prepare the young pharmacy student to interact effectively with doctors, nurses and other health workers.</p> <p>5. At the end of the course the students will get the soft skills set to work cohesively with the team as a team player and addvalue to the pharmaceutical business.</p>
5	BP106RBT	REMEDIAL BIOLOGY–Theory	2019	<p>1.know the kingdoms of life.</p> <p>2.know the body fluids, absorption, digestion, respiration.</p> <p>3.know the excretory products, neural control, chemical coordination, and human reproduction.</p> <p>4.know the Nutrition in plants and photosynthesis.</p> <p>5.know the respiration in plants, cell, and tissues.</p>
6.	BP106RMT	Remedial Mathematics– Theory	2019	<p>1. This program shall create an awareness about the mathematical problems, to develop an</p>

				<p>statistical evaluation.</p> <p>2. To adopt skills in identifying and solving problems.</p> <p>3. Know the theory and their application in Pharmacy research</p> <p>4. Solve the different types of problems by applying theory in drug discovery</p>
7.	BP107P	Human Anatomy and Physiology – Practical	2019	<p>1. Differentiate the structures of the various systems of the human body.</p> <p>2. Perform the experiments like blood cell count, hemoglobin content, bleeding and clotting time and various physiological Parameters theoretically and practically.</p> <p>3. Identify the structural (microscopically and macroscopically) and functional details about different organ systems such as cardiovascular, lymphatic, digestive, muscular system</p>
8.	BP108P	Pharmaceutical Analysis I – Practical	2019	<p>1. This course is designed to perform and get trained to the electro chemical tests like potentiometry, complexometry, polarimetry.</p> <p>2. Hands on training on different titrations like complexometric titrations, precipitation titrations, redox titrations.</p> <p>3. Under stand the process of limit test and procedures.</p> <p>4. Gain knowledge on the determination of Normality, Molarity, Molality.</p> <p>5. Under stand the process how to Prepare the solution and its standardization</p>
9.	BP109P	Pharmaceutics I – Practical	2019	<p>1. This course is designed to impart a fundamental knowledge on the preparatory</p>

				<p>pharmacy with arts of preparing the different conventional dosage forms.</p> <p>2. To understand the different pharmaceutical calculation involved in formulation;</p> <p>3. Practical knowledge on formulation procedure of different dosage forms;</p> <p>4. Highlights the Practical allowance to formulate different types of dosage forms;and</p> <p>Gain Knowledge on criteria to appreciate the good formulation for effectiveness</p>
10.	BP110P	Pharmaceutical Inorganic Chemistry– Practical	2019	<p>1. To recall the sources of limit tests, preparation and identification of compounds.</p> <p>2. To demonstrate the preparation of inorganic pharmaceuticals</p> <p>3. To apply knowledge to perform modified limit tests.</p> <p>4. To analyze various inorganic pharmaceutical compounds.</p> <p>5. To select suitable method for the preparation of inorganic pharmaceuticals.</p> <p>6.To assess quality of inorganic pharmaceuticals.</p>
11	BP111P	Communication skills– Practical	2019	<p>1.To equip students with Pre-presentations and to understand the structure of a good presentation and devise various techniques for delivering a</p>

				<p>successful presentation.</p> <p>2.To help students overcome stage fear and take questions.</p> <p>3.To enable the students to become global citizens.</p> <p>4.This course will prepare the young pharmacy student to interact effectively with doctors, nurses and other health workers.</p> <p>5.At the end of the course the students will get the soft skills set to work cohesively with the team as a team player and add value to the pharmaceutical business.</p>
12	BP112RBP	Remedial biology – Practical	2019	<ol style="list-style-type: none"> 1. How to use microscope, section cutting, mounting, staining, and permanent slide preparation. 2. About the cell and its functions. 3. About the frog with respect to human. 4. About the bone and tissues in humans and plants. 5. About the blood groups, blood pressure and tidal volume
13	BP 201T	Human Anatomy and Physiology-II – Theory	2019	<ol style="list-style-type: none"> 1. Know the gross morphology, structure and functions of various organs of the human body. 2. Perform all the hematological tests with the

				<p>help of specimens</p> <p>3. Note all the points regarding the tissues various organs of human body</p> <p>4. Brief knowledge on clinical significance of various systems in our body.</p> <p>5. Application of the role of genetics in day to day life.</p>
14	BP202T	Pharmaceutical Organic Chemistry I – Theory	2019	<ol style="list-style-type: none"> 1. Guess and write the structure, systematic/trivial name, and pharmaceutical uses (if any) associated with the specified organic compounds. 2. Understand the general concept of isomerism and distinguish structural isomers. 3. Infer the chemical nature of the compounds on the basis of qualitative chemical tests. 4. Understand the significance of certain electronic effects with respect to the reactivity/ stability of organic compounds specified. 5. Understand and gain insight into the organic reactions by analyzing their fair reaction mechanisms.
15	BP203T	Biochemistry – Theory	2019	<ol style="list-style-type: none"> 1. Know the fundamental knowledge on the biochemical Pathways of the body 2. understanding the catalytic role of enzymes, importance of enzyme inhibitors 3. Understand the genetic organization of

				<p>mammalian genome</p> <p>4. Understand the DNA in the synthesis of RNAs and proteins</p>
16	BP 204T	PATHOPHYSIOLOGYI–Theory	2019	<ol style="list-style-type: none"> 1. Identifies Name the signs, symptoms and complications of the diseases. 2. Students Get thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. 3. To Study the aetiology and pathogenesis of the selected disease states 4. The baseline knowledge required to practice medicine safely, confidently, rationally and effectively.
17	BP205T	Computer Applications in Pharmacy – Theory	2019	<ol style="list-style-type: none"> 1 know the various types of application of computers in pharmacy profession 2. know the various types of databases used in profession 3. know the usage of softwares in pharmacy
18	BP206T	Environmental Science– Theory	2019	<ol style="list-style-type: none"> 1. This program shall create an awareness about

				<p>environmental problems, develop an attitude towards of concern for the environment.</p> <p>2 To compare the natural, renewable and non-renewable resources and the problems associated with them.</p> <p>3 To motivate the learners to participate in environment protection and improvement.</p> <p>4 To analyze the concepts of eco system including structure and functions.</p> <p>5 To adopt skills in identifying and solving environmental problems.</p> <p>6 To develop an attitude of concern for the environment.</p>
19	BP207P	Human Anatomy And Physiology II – (Practical)	2019	<p>This subject is to inculcate the students about the structure and functioning of various systems and to perform hematological tests, body temperature and BMI.</p> <p>1. Prepare the charts and tables for easy understanding of various systems and positive & negative feed back mechanism.</p> <p>2. Awareness on family planning devices</p>

				<p>and pregnancy diagnosis test.</p> <p>3. Identify the structural (microscopically and macroscopically) and functional details about different organ systems such as cardiovascular, lymphatic, digestive, muscular system</p>
20	BP208P	Pharmaceutical Organic Chemistry I - Practical	2019	<ol style="list-style-type: none"> 1. Assess the identity in terms of the physico-chemical properties of the compounds of specified chemical classes. 2. Get hands- on- experience in basic techniques of organic synthesis.
21	BP209P	Biochemistry – Practical	2019	<ol style="list-style-type: none"> 1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch), Proteins (albumin and Casein) 2. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method) 3. Qualitative analysis of urine for abnormal constituents 4. Determination of blood creatinine, blood sugar, serum total cholesterol
22	BP210P	Computer Applications in Pharmacy – Practical	2019	<ol style="list-style-type: none"> 1 know the various types of application of computers in pharmacy profession 2. know the various types of databases used in profession 3. know the usage of softwares in pharmacy
23	BP 301 T	Pharmaceutical organic chemistry II (Theory)	2019	<ol style="list-style-type: none"> 1. Guess and writethestructure according to the stereochemical specifications.

				<ol style="list-style-type: none"> 2. Fairly understand the aspects of heterocyclic chemistry in terms of naming and reactivity. 3. Assess and understand the pharmaceutical applications and importance of the specified named reactions
24	BP 302 T	Physical Pharmaceutics I (Theory)	2019	The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms
25	BP 303 T	Pharmaceutical Microbiology (Theory)	2019	<ol style="list-style-type: none"> 1. To acquire knowledge on HVAC systems, layout designs, GMP standards sanitation personal hygiene in sterile product manufacturing facilities. 2. To know the various types of sterile products with their formulation in large scale industries. 3. To develop skill for lab scale manufacture of few SVPs, LVPs, ophthalmic products with labelling and quality control.
26	BP 304 T	Pharmaceutical Engineering (Theory)	2019	<ol style="list-style-type: none"> 1. To know various unit operations involved in manufacturing of pharmaceuticals. 2. To understand the concepts of flow of

				<p>fluids, size reduction and size separation.</p> <p>3 To perform different mechanisms of heat transfer.</p> <p>4 To compare and contrast different types of evaporation and distillation process.</p> <p>5 To determine the factors influencing mixing, filtration and centrifugation.</p> <p>6 To elaborate various preventive methods used for corrosion control in pharmaceutical industries</p>
27	BP 305 P	Pharmaceutical organic chemistry II (Practical)	2019	<p>1. Assess the identity in terms of the physico-chemical properties of the compounds of specified chemical classes.</p> <p>2. Get hands-on experience in basic techniques of organic synthesis</p>
28	BP 306 P	Physical Pharmaceutics I (Practical)	2019	<p>This course helps to compare and evaluate the solubility of various combination compound modify for better solubility approaches by use different level of methods</p>
29	BP 307 P	Pharmaceutical Microbiology (Practical)	2019	<p>1. Learners gain knowledge on some sterile marketed products along with blood products which are not possible in laboratory and large scale manufacture.</p> <p>2. To know the skills of aseptic techniques principles of sterilization and validation of</p>

				<p>aseptic areas.</p> <p>3. Knowledge on blood products and surgical dressing with their formulation details, production and quality control.</p>
30	BP 308 P	Pharmaceutical Engineering (Practical)	2019	<p>1. To understand the basic principles involved in unit operations such as size reduction, size separation, distillation and drying.</p> <p>2. To demonstrate and explain about the construction, working and applications of pharmaceutical equipment's such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer.</p> <p>3. To experiment with the process variables of filtration, evaporation and infer the same.</p> <p>4. To determine radiation constant of brass, iron, unpainted and painted glass.</p> <p>5. To determine overall heat transfer coefficient by heat exchanger and calculate the efficiency of steam distillation.</p> <p>6. To estimate moisture content, loss on drying and construct drying curves for calcium carbonate and starch</p>
31	BP 401 T	Pharmaceutical organic chemistry III (Theory)	2019	<p>1. Guess and writethestructure according to the</p>

				<p>stereochemical specifications.</p> <ol style="list-style-type: none"> Fairly understand the aspects of heterocyclic chemistry in terms of naming and reactivity. Assess and understand the pharmaceutical applications and importance of the specified named reactions.
32	BP 402 T	Medicinal chemistry I (Theory)	2019	<ol style="list-style-type: none"> Fundamental knowledge on the structure, chemistry and therapeutic value of drugs. Understand the Structural Activity Relationship (SAR) of drugs. Importance of physicochemical properties and metabolism of drugs. Chemical synthesis of important drugs under each class.

33	BP 403 T	Physical Pharmaceutics II (Theory)	2019	<ol style="list-style-type: none"> The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms
34	BP 404 T	Pharmacology I (Theory)	2019	<ol style="list-style-type: none"> The subject is to impart knowledge about the action of the drug, different routes of drug administration, toxic effects etc. Students would have understood the pharmacological actions of different categories of drugs. Mechanism of drug action at organ system, sub

				<p>cellular and macromolecular levels have been studied.</p> <ol style="list-style-type: none"> 4. They have understood the application of basic pharmacological knowledge in the prevention and treatment of different diseases. 5. Signal transduction mechanism of various receptors have been understood
35	BP 405 T	Pharmacognosy And Phytochemistry I (Theory)	2019	<p>This subject is intended to impart students about the fundamental knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially, involved in the study of producing plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine.</p> <ol style="list-style-type: none"> 1. Significance of pharmacognostic parameters & study of crude drugs. 2. Understand the underlying reason of evolutionary significance of secondary metabolites production in plants & other organisms & deduce their significance as medicinal molecules. 3. How these primary metabolites are used comprehensively as a source to develop Pharmaceutical & industrial applications. <p>Study about the source, name, chemical structures, methods of extraction, qualitative & quantitative analysis of glycosides & tannin.</p>
36	BP 406 P	Medicinal chemistry I (Practical)	2019	<p>This subject is to inculcate the students will able to know</p> <ol style="list-style-type: none"> 1. Basic knowledge on scope of Medicinal chemistry

				<p>and interlinked subjects</p> <ol style="list-style-type: none"> 2. Handling the glassware and Preparations of the synthetic drugs and how to calibrate the chemicals. 3. Perform the synthesis of the drugs with their chemical structures. 4. Compare the test drug with that of the standard drug by assay methods. 5. Understand the partition coefficient of any two drugs.
37	BP 407 P	Physical pharmaceutics II (Practical)	2019	<p>This course helps to compare and evaluate the solubility of various combination compound modify for better solubility approaches by use different level of methods</p>
38	BP 408 P	Pharmacology I (Practical)	2019	<ol style="list-style-type: none"> 1. Handling of different instruments used in Experimental Pharmacology. 2. Know about the different routes of drug administration, blood withdrawal etc., 3. Evaluate the different activities on animals. <p>Demonstration of different simulation methods</p>

39	BP 409 P	Pharmacognosy and Phytochemistry (Practical)	2019	<ol style="list-style-type: none"> 1. Demonstrate chemical tests to identify unorganized crude drugs 2. Evaluate the quality and purity of crude drugs 3. Perform linear measurements for crude drug identification
40	BP501T	MEDICINAL CHEMISTRY – II- Theory	2019	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activityrelationships of drugs, importance of physicochemical properties and metabolism ofdrugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.
41	BP502T.	Industrial Pharmacy-I- Theory	2019	Course enables the student to understand and appreciate the influence ofpharmaceutical additives and various pharmaceutical dosage forms on the performance ofthe drug product
41	BP503T.	PHARMACOLOGY-II- Theory	2019	This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.
42	BP504T.	PHARMACOGNOSY AND PHYTOCHEMISTRY II- Theory	2019	The main purpose of subject is to impart the students the knowledge of how thesecondary metabolites is produced in the crude drugs, how to isolate and identify andproduce them industrially. Also, this subject involves the study of producing the plants andphytochemicals through plant tissue culture, drug interactions and basic principles oftraditional system of medicine
43	BP505T	PHARMACEUTICAL JURISPRUDENCE- Theory	2019	This course is designed to impart basic knowledge on importantlegislations related to the profession of pharmacy in India.

44	BP506P.	Industrial Pharmacy-I- Practical	2019	This is help to understand the basic information of formulation process and how to optimise quality control solid, semisolid and parenteral dosage forms
45	BP507P	PHARMACOLOGY-II- Practical	2019	<ol style="list-style-type: none"> 1. Handling of different instruments used in Experimental Pharmacology. 2. Know about the different routes of drug administration, blood withdrawal etc. 3. Evaluate the different activities on animals. 4. Demonstration of different simulation methods. They would have finally learnt to apply the knowledge of drugs practically using simulated pharmacological experiments.
46	BP508P.	PHARMACOGNOSY AND PHYTOCHEMISTRY II - Practical	2019	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents by use chromatographic technique
47	BP601T.	MEDICINAL CHEMISTRY – III- Theory	2019	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure activity relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer aided drug design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs

48	BP602T.	PHARMACOLOGY-III- Theory	2019	This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition, emphasis on the principles of toxicology and chrono pharmacology.
49	BP603T.	HERBAL DRUG TECHNOLOGY- Theory	2019	This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs
50	BP604T.	BIOPHARMACEUTICS AND PHARMACOKINETICS- Theory	2019	This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems raised therein
51	BP605T.	PHARMACEUTICAL BIOTECHNOLOGY - Theory	2019	Biotechnology has a long promise to revolutionize the biological sciences and technology. Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting. Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs. Biotechnology has already produced transgenic crops and animals and the future promises lot more. It is basically a research-based subject.
52	BP606T.	PHARMACEUTICAL QUALITY ASSURANCE- Theory	2019	This course deals with the various aspects of quality control and quality assurance aspects of

				pharmaceutical industries. It deals with the important aspects like GMP, QC tests, documentation, quality certifications and regulatory affairs
53	BP607P.	MEDICINAL CHEMISTRY- III- Practical	2019	This course helps to how to separation and identification compound given unknown mixture. It imparts take it knowledge on crude separation and identification technique
54	BP608 P.	PHARMACOLOGY-III- Practical	2019	1.Handling of different instruments used in Experimental Pharmacology. 2.Know about the different routes of drug administration, blood withdrawal etc., 3.Evaluate the different activities on animals. 4.Demonstration of different simulation methods. 5.They would have finally learnt to apply the knowledge of drugs practically using simulated pharmacological experiments
55	BP609P.	HERBAL DRUG TECHNOLOGY-- Practical	2019	This subject gives the student the knowledge of basic understanding of herbal drug formulation and determination of herbal content
56	BP701T	Instrumental Methods of Analysis (Theory)	2019	1) To understand selected instrumental analytical techniques (spectroscopic and chromatographic methods) and differentiate with volumetric analysis. 2) To gain knowledge on interaction of EMR with matter and to build the analytical understanding at the level of atom, group and molecular structure of organic and inorganic compounds with different functional groups and their applications

				<p>in pharmacy.</p> <p>3) To maximize knowledge on characterization and estimation of ions by spectroscopical techniques</p> <p>4) To simplify affinity of matter with stationary phase and mobile phase, physical and chemical.</p> <p>This subject is intended to impart students about the fundamental knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially, involved in the study of producing plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine.</p>
57	BP702T	Industrial Pharmacy II (Theory)	2019	<p>1. This course is designed to impart knowledge and skills necessary to train the students to be on par with the routine of Industrial activities in Production.</p> <p>2. On completion of this course, it is expected that students will be able to understand.</p> <p>3. Handle the scheduled activities in a pharmaceutical firm. Manage the production of large batches of pharmaceutical formulations</p>

58	BP703T	Pharmacy Practice (Theory)	2019	<ol style="list-style-type: none"> 1. Understand the elements of pharmaceutical care and provide comprehensive patient care services 2. Interpret the laboratory results to aid the clinical diagnosis of various disorders. <p>Provide integrated, critically analysed medicine and poison information to enable healthcare professionals in the efficient patient management</p>
59	BP704T	Novel Drug Delivery System (Theory)	2019	<ol style="list-style-type: none"> 1. This subject is designed to impart basic knowledge on the area of novel drug delivery systems. Upon completion of the course student shall be able 2. To understand various approaches for development of novel drug delivery systems. 3. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation
60	BP705P	Instrumental Methods of Analysis (Practical)	2019	<ol style="list-style-type: none"> 1. Discusses the effect of impurities on the quality of drugs and behavioural pattern of drugs 2. Aids in understanding the SOP and usage of software associated with various analytical instruments 3. Helps in gaining knowledge of interpretation of spectra and of chromatograms

61	BP706PS	Practice School	2019	<ol style="list-style-type: none"> 1. Work in team and undertake a project in the area of Pharmacy 2. Present, exhibit and document the project work • Develop a project report 3. Apply concepts of pharmaceutical sciences for executing the project 4. Apply appropriate research methodology while formulating a project 5. Define specifications, synthesize, analyse, develop and evaluate a project
62	BP801T	Biostatistics and Research Methodology (Theory)	2019	<ol style="list-style-type: none"> 1. Develop the ability to apply the methods while working on a research project work 2. Describe the appropriate statistical methods required for a particular research design 3. Choose the appropriate research design and develop appropriate research hypothesis for a research project 4. Develop a appropriate framework for research studies
63	BP802T	Social and Preventive Pharmacy (Theory)	2019	<ol style="list-style-type: none"> 1. After the successful completion of this course, the student shall be able to: Acquire high consciousness/ realization of current issues related

				<p>to health and pharmaceutical problems within the country and worldwide.</p> <p>2. Have a critical way of thinking based on current healthcare development.</p> <p>Evaluate alternative ways of solving problems related to health and pharmaceutical issues</p>
64	BP809	Biopharmaceutics & Pharmacokinetics Practicals	2019	<ol style="list-style-type: none"> 1. Compare the in-vitro drug release profile of different marketed products 2. Perform the solubility enhancement techniques for improvement of drug release of poorly water-soluble drugs 3. Estimate the bioavailability (absolute and relative) and bioequivalence from the given clinical data 4. Calculate the drug content in blood sample using Area Under Curve approach 5. Calculate and interpret various pharmacokinetic parameters from the given clinical data
65	BP803ET	Pharma Marketing Management (Theory)	2019	
66	BP804ET	Pharmaceutical Regulatory Science (Theory)	2019	<ol style="list-style-type: none"> 1. Explain the process of drug discovery, development and generic product development 2. Describe the regulatory approval process and registration procedures for API and drug products. 3. Basic understanding of regulations of India with

				<p>other global regulated markets</p> <ol style="list-style-type: none"> 4. Understand the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 5. Learn the basic understanding the importance of orange book, Federal Register, Code of Federal Regulatory, and purple book
67	BP805ET	Pharmacovigilance (Theory)	2019	<ol style="list-style-type: none"> 1. Explain the regulatory requirements for conducting clinical trial 2. Describe in detail about various types of clinical trial designs 3. Explain the responsibilities of key players involved in clinical trials 4. Describe the documentational requirements for Clinical trials 5. Explain Adverse drug reaction and its management
68	BP806ET	Quality Control and Standardization of Herbals (Theory)	2019	<ol style="list-style-type: none"> 1. Explain basic tests for drugs to obtain dosage form for pharmaceutical substances and medicinal plants 2. Explain methods for evaluation of pharmaceutical

				<p>substances, medicinal plants and commercial crude drugs.</p> <ol style="list-style-type: none"> Describe guidelines for cGMP, GAP, GMP and GLP for quality assurance of herbal drugs in industry Describe guidelines for quality control of herbal drugs and evaluation of safety and efficacy of herbal medicines. Explain regulatory approval process and their registration in Indian and international markets.
69	BP807ET	Computer Aided Drug Design (Theory)	2019	<ol style="list-style-type: none"> Explain the various stages of drug discovery and learn the concept of bioisosterism. Describe physicochemical Properties and the techniques involved in QSAR Explain various structure-based drug design methods (Molecular docking, Denovo drug design) Learn the concept of pharmacophore and modelling techniques Explain the various techniques in Virtual Screening
70	BP808ET	Cell and Molecular Biology	2019	<ol style="list-style-type: none"> It deals with understanding the molecular aspects

		(Theory)	<p>of the biology.</p> <ol style="list-style-type: none">2. It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription.3. It also helps in understanding the concepts of cellular function4. It deals with understanding the molecular aspects of the biology. It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription. <p>It also helps in understanding the concepts of cellular function</p>
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	BP809ET	Cosmetic Science (Theory)	2019	<ol style="list-style-type: none"> 1. Cosmetic Science is an interdisciplinary applied science program providing students with the opportunities to develop professional skills and fundamental concepts driving cosmetic science. 2. Cosmetic Science focuses on the needs of the cosmetic industry and its consumers, in addition to providing students with the critical and evaluative skills to become professional scientists. 3. Cosmetic Science covers a range of sciences, both pure and applied, formulation development and industry operations, all of which give you a broad range of career opportunities.
	BP810ET	Experimental Pharmacology (Theory)	2019	<ol style="list-style-type: none"> 1. Study of commonly used instruments in experimental pharmacology. 2. Introduction to CPCSEA guidelines and OECD guidelines. 3. Introduction to animal physiology with their biochemical reference values in various

				<p>animal species.</p> <ol style="list-style-type: none"> 4. Study of methods for collection of blood, body fluids and urine from experimental animals. 5. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).
	BP811ET	Advanced Instrumentation Techniques (Theory)	2019	<ol style="list-style-type: none"> 1. Apply the analytical techniques to study bulk-drug pharmaceuticals, quality control. 2. Develop in-depth knowledge and critical awareness of the application of modern. 3. Know preparation and standardization of various concentrations of acids and bases. 4. Understand the basic concepts involved in electro-analytical techniques and its types. 5. Understand theory, principle, types and techniques of coulometric titration
	BP812ET	Dietary Supplements and Nutraceuticals (Theory)	2019	<ol style="list-style-type: none"> 1. Know different Acts and guidelines that regulate Drugs & Cosmetics, Medical Devices, Biologicals & Herbals, and Food &

				<p>Nutraceuticals industry in India.</p> <p>2. Understand the approval process and regulatory requirements.</p> <p>3. Drugs & Cosmetics, Medical Devices, Biologicals & Herbals, and Food& Nutraceuticals</p>
	BP813PW	Project Work	2019	<p>6. Work in team and undertake a project in the area of Pharmacy</p> <p>7. Apply concepts of pharmaceutical sciences for executing the project</p> <p>8. Apply appropriate research methodology while formulating a project</p> <p>9. Define specifications, synthesize, analyse, develop and evaluate a project</p> <p>10. Present, exhibit and document the project work • Develop a project report</p>

M.Pharmacy

46. M.Pharmacy

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MPH 101A(Pharmacology)	General & Systemic Pharmacology	2019	<ol style="list-style-type: none">6. Describe the instruments in experimental pharmacology.7. Know CPCSEA guidelines and OECD guidelines.8. Know animal physiology with their biochemical reference values in various animal species.9. Do collection of blood, body fluids and urine from experimental animals.10. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).
2	MPH 102A(Pharmacology)	Clinical Pharmacology & Toxicology	2019	<ol style="list-style-type: none">1. The pathophysiology of selected disease states and the rationale for drug therapy.2. The controversies in drug therapy.3. The importance of preparation of individualized therapeutic plans based on diagnosis.4. Understanding the concepts of Clinical research;Therapeutic drug monitoring (TDM) ; concepts of Pharmacotherapeutics, Management & Current Good Clinical Practice of various diseases.5. Studying of various types, mechanisms of

				Drug interaction; rational for drug combinations; Drug Toxicity and its prevention; Adverse drug reactions and its monitoring
3	MPH 103	Practical 1	2019	<ol style="list-style-type: none"> 1. Recording of concentration response curve (CRC) of acetylcholine 2. Record of the CRC of 5-HT on rat fundus preparation. 3. Record of the CRC of histamine on guinea pig ileum 4. Inotropic and chronotropic effects of drugs on isolated frog heart
4	MPH 104	Practical-II(MAT)	2019	<ol style="list-style-type: none"> 1. Explains the importance of modern instrumentation in pharmaceutical analysis 2. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms
5	MPH 105	Modern Analytical Techniques and biostatics Theory	2019	<ol style="list-style-type: none"> 1. Explains the importance of modern instrumentation in pharmaceutical analysis 2. Describes the fundamental principles and applications of spectroscopic

				<p>techniques Viz., UV- Visible, IR, FTIR.</p> <ol style="list-style-type: none"> 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms. <p>Explains the concepts of Statistics and their applications in pharmacy</p>
6.	MPH 106	Human Values and Professional Ethics-I	2019	<ol style="list-style-type: none"> 1. Awareness of ethical issues and basic ethical approaches. 2. Improved writing skills and understanding of ethical conflict. 3. Enables students to develop ability for moral reasoning and act with ethical deliberations. 4. After studying ethics one is equipped with the ethical sensitivity and moral understanding required to solve complex ethical dilemmas. 5. Learn how to live peacefully
7.	MPH 107	Comprehensive Viva	2019	<ol style="list-style-type: none"> 1. Know the fundamental knowledge on the structure and functions of the various systems of the human body. 2. understanding all the homeostatic mechanisms of the body 3. Understand the relationship of anatomy with various disciplines of pharmacy.

				4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition
8.	MPH 201A (Pharmacology)	Molecular Pharmacology	2019	<ol style="list-style-type: none"> 1. Explain the modes of action of drug at the cellular level by describing their interactions with target proteins 2. Explain the receptor signal transduction processes. 3. Explain the molecular pathways affected by drugs. 4. Understanding the applicability of molecular pharmacology and biomarkers in drug discovery process. 5. Outline the molecular features that are responsible for agonist and antagonist binding, and coupling to effector processes, with reference to the nicotinic, muscarinic, and β-adrenergic receptors
9.	MPH 202 A	Methods in Drug Evaluation	2019	<ol style="list-style-type: none"> 1. Know the commonly used instruments in experimental pharmacology. 2. describe the animal physiology with their biochemical reference values in various animal species. 3. Study of methods for collection of blood, body fluids and urine from experimental animals. 4. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).

10.	MPH 203	Practical 1	2019	<ol style="list-style-type: none"> 1. Calculation of the PA_2 Calculate the PA_2 Value 2. Interpolation bioassay 3. Matching or bracketing bioassay 4. Three point bioassay 5. Four point bioassay
11	MPH 204	Practical-II(BPK)	2019	<ol style="list-style-type: none"> 1. Compare and differentiate between compartmental and non compartmental analysis 2. Identify the physiological, Physicochemical and dosage form related factors that affects drug absorption from different dosage forms 3. Examine the absolute and relative bioavailability of drugs form different dosage forms using either plasma or urine data. 4. Compare the bioequivalence of two drug products
12	MPH 205	BIO-PHARMACEUTICS & PHARMACOKINETICS	2019	<ol style="list-style-type: none"> 1. Understand the concept of ADME of drug in human body. 2. Determine the various pharmacokinetic parameters from either plasma

				<p>concentration or urinary excretion data for drug</p> <p>3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule</p>
13	MPH 206	Human Values and Professional Ethics-II	2019	<ol style="list-style-type: none"> 1. Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field 2. Learn about morals, values & work ethics. 3. Develop commitment 4. Learn about the different professional roles. 5. Ethical, social and environmental awareness 6. Professional rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct
14	MPH 207	Comprehensive Viva	2019	
15	MPH 301	Mid-Term Evaluation of Research project	2019	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups. 5. This necessarily introduces the dimension of workload management into the program

				to enable completion of a large, relatively unstructured "assignment" over the course of the semester.
16	MPH 401	Project thesis submission & presentation and Project Viva voce	2019	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups. 5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.

M. Pharmacy (Pharmaceutics)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1	MPH 101B	ADVANCED PHARMACEUTICAL TECHNOLOGY	2019	<ol style="list-style-type: none"> 1. Course designed to impart advanced knowledge and skills required to learn various aspects and concepts at pharmaceutical industries. 2. The Active Pharmaceutical Ingredients and Generic drug Product 3. The elements of Preformulation studies, Objectives Upon completion of the course, student shall be able to understand Optimization Techniques. 4. Industrial Management and GMP Considerations, development & Stability Testing, sterilization process, Pilot Plant Scale Up Techniques & packaging of dosage forms
2	MPH 102B(Pharmaceutics)	Advanced Pharmaceutics	2019	<ol style="list-style-type: none"> 1. Upon completion of this program the student will have fundamental knowledge in preparing conventional dosage forms, pharmaceutical calculation involved in formulation and appreciate the importance of good formulation for effectiveness. 2. The need, concept, design and evaluation of various customized, sustained and controlled release dosage forms using solubility studies and basic

				<p>theories of dissolution.</p> <p>3. To formulate and evaluate various novel drug delivery systems based on the molecular weight determination of polymers and its stability studies.</p>
3	MPH 103	Practical-I(PHARMACEUTICS)	2019	<ol style="list-style-type: none"> 1. The passage of drugs, biopharmaceutical parameters. 2. How to do dissolution studies for the dosage forms to know the bioavailability of the drugs. 3. Solubility studies for the drugs based on its pH and its applications in the formulations of drug delivery systems. 4. To determine the molecular weight of the polymers. 5. Gives an fundamental knowledge on the stability studies
4	MPH 104	Practical-II(MAT)	2019	<ol style="list-style-type: none"> 5. Explains the importance of modern instrumentation in pharmaceutical analysis 6. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 7. Discusses the principle and applications of chromatographic techniques 8. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage form
5	MPH 105	Modern Analytical Techniques and biostatics Theory	2019	<ol style="list-style-type: none"> 5. Explains the importance of modern instrumentation in pharmaceutical analysis 6. Describes the fundamental principles and applications of spectroscopic

				<p>techniques Viz., UV- Visible, IR, FTIR.</p> <p>7. Discusses the principle and applications of chromatographic techniques</p> <p>8. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms.</p> <p>9. Explains the concepts of Statistics and their applications in pharmacy</p>
6.	MPH 106	Human Values and Professional Ethics-I	2019	<p>6. Awareness of ethical issues and basic ethical approaches.</p> <p>7. Improved writing skills and understanding of ethical conflict.</p> <p>8. Enables students to develop ability for moral reasoning and act with ethical deliberations.</p> <p>9. After studying ethics one is equipped with the ethical sensitivity and moral understanding required to solve complex ethical dilemmas.</p> <p>10. Learn how to live peacefully</p>
7.	MPH 107	Comprehensive Viva	2019	
8.	MPH 201B (Pharmaceutics)	INDUSTRIAL PHARMACY	2019	<p>1. The elements of preformulation studies.</p> <p>2. Acquire skill in preparation of different types of tablets.</p> <p>3. Acquire knowledge for evaluation of various dosage forms.</p> <p>4. Acquire the knowledge of processing of dosage form on large scale that suit pharma industry</p>
9.	MPH202B(Pharmaceutics)	PROCESS VALIDATION & CGMP	2019	<p>1. Acquire knowledge on various quality assurance systems, processes and current</p>

				<p>regulatory guidelines related to manufacturing and distribution.</p> <p>2. Address quality issues and provide solutions needed to attain Quality leadership in an environment of continual improvement.</p> <p>3. Understand the importance of effective documentation.</p> <p>4. To prepare professionally competent individuals with Quality concept being engrained to achieve global quality standards in pharmaceutical industries</p>
10.	MPH 203	Practical-I	2019	<p>1. Gain knowledge and acquire skills to prepare different types of tablets.</p> <p>2. Highlights the handling of different equipment's for the preparation and evaluation of various dosage forms</p>
11	MPH 204	Practical-II(BPT)	2019	<p>5. Compare and differentiate between compartmental and non compartmental analysis</p> <p>6. Identify the physiological, Physicochemical and dosage form related factors that affects drug absorption from different dosage forms</p> <p>7. Examine the absolute and relative bioavailability of drugs form different dosage forms using either plasma or urine data.</p>

				8. Compare the bioequivalence of two drug products
12	MPH 205	BIO-PHARMACEUTICS & PHARMACOKINETICS	2019	<ol style="list-style-type: none"> 1. Understand the concept of ADME of drug in human body. 2. Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug 3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule
13	MPH 206	Human Values and Professional Ethics-II	2019	<ol style="list-style-type: none"> 7. Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field 8. Learn about morals, values & work ethics. 9. Develop commitment 10. Learn about the different professional roles. 11. Ethical, social and environmental awareness 12. Professional rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct
14	MPH 207	Comprehensive Viva	2019	
15	MPH 301	Mid-Term Evaluation of Research project	2019	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program.

				<ol style="list-style-type: none"> 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups. 5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.
16	MPH 401	Project thesis submission & presentation and Project Viva voce	2019	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups. 5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured

				"assignment" over the course of the semester.
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Engineering

Chemical Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MABST 101	Mathematics – I	2019	<ol style="list-style-type: none"> 1. Analyze differential equations and solve them. Apply differential equations to engineering problems 2. Use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients. 3. Solve an initial value problem for an n^{th} order ordinary differential equation using the Laplace transform 4. Expand functions as power series using Maclaurin's and Talor's series 5. Draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc using curve tracing method to find length, area, volume. Use multiple integral in evaluating area and volume of any region bounded by the given curves.

2	CHBST 102	Chemistry for Chemical Engineering - I	2019	<ol style="list-style-type: none"> 1. Quantum mechanical model of atom, wave mechanical model , Applications to Hydrogen atom. 2. Bonding and energy levels of bonding and shapes of many atom molecules , EAN rule for coordination compounds. 3. Conformations of cyclic and acyclic systems. Geometrical isomerism, Optical activity and optical isomerism. 4. Factors influencing acidity, basicity, and nucleophilicity of molecules, Hyper conjugation. 5. Strategies for synthesis of organic compounds.
3	ENHST 103	English	2019	<ol style="list-style-type: none"> 1. Learn the elements of grammar and composition of English Language. 2. Learn literary texts such as Short stories and prose passages. 3. Maintain linguistic competence through training in vocabulary, sentence structures and pronunciation. 4. Develop communication skills by cultivating the habit of reading comprehension passages. 5. Develop the language skills like listening, speaking, reading and writing. 6. Make use of self-instructed learner friendly modes of language learning through competence.
4	EEEST104	Basics of Electrical & Electronics Engineering	2019	<ol style="list-style-type: none"> 1. Demonstrate and able to explain electrical components, electrical circuits and 2. Kirchoff's laws. 3. Acquire knowledge of DC circuit analysis, DC

				<p>network theorems and their applications</p> <ol style="list-style-type: none"> 4. Formulate and solve complex AC, DC circuits 5. Understand the principles of operation of DC machines, single phase transformers and three phase induction motors 6. Identify the starting methods of starting synchronous and induction motors and speed control methods for DC motors
5	MEEST 105	Engineering Graphics and Design	2019	<ol style="list-style-type: none"> 1. Make a distinction between first angle projection and third angle projection of drawing. 2. Draw hyperbola, parabola, Involutives and Cycloidal curves. 3. Draw sections of solids including cylinders, cones, prisms and pyramids. 4. Draw projections of lines, planes, solids and sections of solids. 5. Draw orthographic projections of lines, planes, and solids.
6	ENHSP 106	English Communication Lab	2019	<ol style="list-style-type: none"> 1. Better pronunciation and accent 2. Ability to use functional English 3. Competency in analytical skills and problem solving skills 4. Increase possibilities of job prospects 5. Communicate confidently in formal and informal contexts
7	MABST 201	Mathematics-II	2019	<ol style="list-style-type: none"> 1. Check whether the system of linear equations is consistent or not. Use Cayley-Hamilton theorem to find inverses or powers of matrices. 2. Use Eigen values and vectors to reduce Quadratic forms to normal form. Use Green's theorem to evaluate line integrals along simple closed contours on the plane. Use Stokes' theorem to give a physical interpretation of the curl of a vector field 3. Find the Fourier Series to represent function as a series of constants times sine and cosine

				<p>functions of different frequencies in order to observe periodic phenomenon.</p> <p>4. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions.</p> <p>5. Study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena.</p>
8	PYBST 202	Engineering Physics	2019	<p>Develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses</p> <p>2. Understand the quantum mechanics and ultimately the quantum behaviour of charged particles when they are in motion.</p> <p>3. Identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems</p> <p>4. Apply the basic principles of Mechanics of rigid body and continuous media and their applications</p> <p>5. Understand the principles in electrostatics and electromagnetics and magnetic properties of materials.</p> <p>6. Understand size depended properties of nano dimensional materials and their effective utilization in</p>

				<p>making nano- and micro-devices for further microminiaturization of electronic devices.</p> <p>7. Think and participate deeply, creatively, and analytically in emerging areas of engineering technology.</p> <p>8. Learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.</p> <p>9. Provide multidisciplinary experiences throughout the curriculum.</p>
9	CSEST 203	Programming for Problem Solving	2019	<p>. Develop and test programs in C & correct syntax and logical errors</p> <p>2. Implement conditional branching, iteration and recursion</p> <p>3. Decompose a problem into functions and synthesize a complete program</p> <p>4. Use arrays, pointers, strings and structures to formulate algorithms' and programs</p> <p>5. Use file to perform read and write operations</p> <p>6. Handle programming assignments based on class, abstraction, encapsulation, overloading and inheritance.</p>
10	CHBST 204	Chemistry for Chemical	2019	To enable students to identify, formulate, and solve complex

		Engineering - II		<p>chemical engineering problems by applying principles of engineering, science, and mathematics</p> <ol style="list-style-type: none"> 2. To enable students to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors 3. To enable students to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions 4. To enable students to recognize ethical and professional responsibilities in engineering situations 5. To enable students to acquire and apply new knowledge as needed, using appropriate learning strategies 6. To enable students to communicate effectively with a range of audiences 7. To enable students to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
11	MEESP 205	Workshop / Manufacturing Practice	2019	Design and develop different types of wood joints based on the requirement

				<p>Design and develop different types of fittings as per requirement</p> <p>Able to develop prototype models by using tin smithy tools.</p> <p>Design and develop different moulds as per practical requirements.</p> <p>Able to connect bulbs either series or parallel</p>
12	CSESP 206	Programming for Problem Solving Lab	2019	<p>Able to know concepts in problem solving</p> <p>To do programming in C language</p> <p>To write diversified solutions using C language</p> <p>Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre- processor.</p>
13	CEMCT 207	Environmental Science	2019	<p>Able to understand the importance of the environment</p> <p>Able to identify conservation concepts of natural resources</p> <p>Able to identify problems due to human interactions in the environment</p> <p>Able to understand the enforcement of environment acts in our constitution</p> <p>Capable of managing social issues related to environment</p>
14	MABST 301	Mathematics – III	2019	<p>I. Applying various statistical models and methods for drawing conclusions and making decisions under uncertainty in engineering</p>

				<p>contexts</p> <p>2 Apply statistical and numerical methods in various computer science related projects, seminars and research</p> <p>3 Apply the knowledge of iterative methods to solve algebraic and transcendental equations, simultaneous linear equations, ODE (ordinary differential equations)</p> <p>4 Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration Demonstrate a basic knowledge of the techniques for accurate and efficient solution of</p> <p>5 models based on linear and nonlinear systems of equations, ordinary differential equations and partial differential equations.</p>
15	CEEST 302	Engineering & Solid Mechanics	2019	<p>. Learn about the elastic and plastic behavior of material and evaluate stress invariants, principal stresses and their directions.</p> <p>2. Euler's Axioms, Free Body Diagrams, Dynamics of point mass models of bodies.</p> <p>3. Shear Force and Bending Moment</p> <p>4. Principal Moments of Inertia, Moment of momentum relations for rigid bodies, Euler's Equations of Motion.</p> <p>5. Concept of strain, strain displacement relations, compatibility conditions, Uniaxial stress and strain analysis of bars.</p>

16	CHPCT 303	Chemical Process Calculations	2019	<ul style="list-style-type: none"> . To understand the dimension-unit systems and their inter relationships, to be able to represent mixture compositions in different forms and to be able to make calculations using reaction stoichiometry. 2. To be able to make mass balance calculations for different operations, without reaction, its mathematical form and its application to different operations and reactions. 3. To be able to make mass balance calculations for different operations, with reaction , its mathematical form and its application to different operations and reactions. 4. To have learnt the significance of vapor pressure and its dependence and to have learnt different representations of partial saturation and to apply ideal gas law in conjunction with variation in levels of saturation. 5. To be able to estimate parameters like oxygen requirement, flue gas analysis, energy released and flame temperatures.
17	CHPCT 304	Momentum Transfer	2019	<ul style="list-style-type: none"> . To be able to perform dimensional analysis of fluid flow problems and develop pressure drop equations for fluid static equipments in

				<p>which fluid is at rest.</p> <ol style="list-style-type: none"> 2. To have the knowledge on different types of flow regions in fluid flow, rheological properties of fluids, turbulence and boundary layers. 3. To be able to carry out macroscopic mass, momentum and energy balance to solve engineering problems related to fluid flow and to analyze flow past solid surface, through packed bed and in fluidized beds. 4. Determine the minimum fluidization velocity and terminal velocity of the fluid in Stokes and Newton's law regions. 5. The analysis of fluid flow measuring devices like Orifice meter, Venturimeter, Rotameter and Pitot tube, the construction and working of Centrifugal and reciprocating pumps. And also give the knowledge on different types of valve, selection of pipe and fittings.
18	CHPCT 305	Mechanical Unit Operations	2019	<p>To be able to determine the Volume surface mean diameter, mass mean diameter, number of particles and types of mixer</p> <p>To have the knowledge of different types of Crushers, grinders, ultrafine grinders, cutters, to be able to find the power requirement using three crushing laws.</p> <ol style="list-style-type: none"> 3. To be able to calculate the screening effectiveness .To have understood settling processes and flotation technique. 4. To develop the rate equations for constant

				<p>pressure and constant volume filtration techniques and also to solve the problems related to these techniques. To have acquired the construction and operation of different filtration, settling and clarifying equipment.</p> <p>5. To understand the functioning of agitated vessels and to calculate the power consumption. To have the knowledge on different types of turbines, blending and mixing.</p>
19	MABST 402	Probability & Statistics	2019	<p>To make use of the concepts of probability and their applications. Apply Probability theory to find the chances of happening of events.</p> <p>2. To discuss Distributions and Properties and applications.</p> <p>3. To measure the quantity of estimations.</p> <p>4. Design the components of a classical hypothesis test. Infer the statistical inferential methods based on small and large sampling tests. Interpret the association of characteristics and through correlation and regression tools.</p> <p>5. To acquire knowledge of Quality control charts.</p>
20	CHPCT 403	Chemical Engineering Thermodynamics – I	2019	<p>To have learnt the fundamental ideas about energy, equilibrium and reversibility. To be able to apply first law to estimate heat and work effects in closed, open and flow</p>

				<p>systems.</p> <p>2. To understand PV and PT phase diagrams, ideal gas law and its applications. To be able to estimate heat and work effects for different processes – isothermal, isobaric, isometric, and adiabatic processes.</p> <p>3. To be to apply second law of thermodynamics to estimate efficiency of a cycle. To have understood the concept of entropy and its estimation.</p> <p>4. To have learnt different refrigeration cycles and also to be able to calculate their COP.</p> <p>5. To have learnt the thermodynamic analysis of flow processes.</p>
21	CHPCT 404	Heat transfer	2019	<p>. To be able to calculate the heat transfer flux in one-dimensional heat conduction .To have learnt the concepts of turbulence, boundary layer and analogies.</p> <p>2. To have understood the construction and flow patterns in heat exchange equipment.</p>

				<ol style="list-style-type: none"> 3. To be able to calculate heat flux in natural convection. To be able to estimate heat flux in forced convection. 4. To have understood the concepts of black body, view factors and to be able to calculate radiation heat flux. To be able to handle conduction-convection conduction-convection- radiation heat transfer. 5. To be able to design heat exchangers and condensers. To have understood the functioning of evaporators.
21	CHPCT 405	Mass Transfer – I	2019	<ol style="list-style-type: none"> . To be able to calculate the flux in cases involving diffusive transfer. To appreciate the contribution of turbulence to transfer and to calculate coefficients and from them, the flux. 2. To be able to differentiate different representations of resistances and to properly integrate them to obtain the overall resistance. To be able to estimate the process parameters like solvent requirement, number of theoretical stages, height and diameter of columns. 3. To understand equilibrium relevant to absorption and to calculate the number of stages, number and height of transfer units.

				<p>4. To understand the equilibrium concerned to humidification, various methods of conducting the operation and to design a cooling tower.</p> <p>5. To understand the mechanism of drying operation and to calculate the time of drying.</p>
22	CHPCT 406	Chemical Technology	2019	<p>Able to differentiate unit operations and unit processes. To Know the basic principles of different unit operations. Able to know constituents of petroleum, and the extraction of petroleum compounds petrol, diesel</p> <p>2. Can understand the raw materials and production of Ammonia, Urea, Phosphorus industries.</p> <p>3. Can understand the raw materials, pulp and paper industry, reactions involved and the production of sugar, starch.</p> <p>4. Get knowledge about alcohol, soaps, edible oils, hydrogenation of oils and extraction of vegetable oils.</p> <p>5. Can understand the difference between paints and varnishes and about the production.</p> <p>Know the classification of plastics, industrial production of plastics and rubbers.</p>
23	CHBST 407	Fundamentals of Bio-technology	2019	<p>Able to know about structures of yeast, bacteria, molds and their growth .Able to understand about structures of</p>

				<p>prokaryotic and eukaryotic cells with examples</p> <ol style="list-style-type: none"> 2. Can know the classification, structure and properties of carbohydrates, lipids and nucleic acids 3. Able to know the types of proteins, structures and their functional relationship 4. Get knowledge of cell metabolism, concepts of bioenergetic and different biochemical fermentation processes 5. Can understand about the nature of fermentation, oxygen requirements and biochemical mechanisms of lactic acid, ethanol. Can understand about genomes and plasmids, rDNA technology and cloning
24	MABST 501	Numerical Methods in Chemical Engg.	2019	<p>After the completion of course, students will be able to Apply numerical methods to solve all type of equations. Finite Differences And Difference Equations</p> <ol style="list-style-type: none"> 2. Derive interpolating polynomials using interpolation formulae. 3. Analyse the data and develop skills to solve Algebraic & Transcendental Equations. 4. To find the Solution Of Linear And Non-Linear Algebraic Equations. 5. Derive numerical methods solution of Ordinary & Partial Differential Equations .

25	CHPCT 502	Chemical Engineering Thermodynamics – II	2019	<p>1. To be able to develop and use expressions for property estimation. To be able to calculate property values from equations of state.</p> <p>2. To have learnt the concepts of residual, excess, partial molar properties and property changes of mixing. To have understood concepts of ideal solutions, fugacity and activity coefficient.</p> <p>3. To be able to use modified forms of Raoult's law for non-ideal systems, Dewpoint and bubble point calculations.</p> <p>4. To be able to make phase equilibrium calculations using Raoult's law. To have learnt the concepts of LLE and VLLE.</p> <p>5. To have learnt the concept of equilibrium constant and its calculation. To be able to estimate equilibrium conversion of single and simple multiple reactions.</p>
26	CHPCT 503	Mass Transfer – II	2019	<p>To be able to analyze different phase diagrams – pxy, txy, hxy, bimodal solubility curve and Nxy representations. To be able to calculate flash calculations. To be able to apply Rayleigh's equation (differential distillation).</p> <p>2. To be able to calculate the number of ideal stages using Ponchon-Savarit and McCabe- Theile procedures. To acquire a fundamental understanding of azeotropic and extractive distillation.</p>

				<p>3. To be able to calculate the solvent requirement and number of stages for different contacting patterns like single stage, cross current and countercurrent modes.</p> <p>4. To be familiar with different constructions of equipment suitable for extraction and leaching.</p> <p>5. To be able to explain the equilibrium of adsorption and to calculate the material requirement and number of stages for different contacting schemes. To have visualized fixed and moving bed adsorption and regeneration.</p>
27	CHPCT 504	Chemical Reaction Engineering – I	2019	<p>To be able to write rate expressions for elementary reactions and to study the temperature dependence of reactions.</p> <p>2. b. To be able to apply analytical procedures (integral, differential, fractional life, initial velocity methods) to convert batch reactor data in to kinetic expression.</p> <p>3. d. To be able to make performance analysis of multiple reactor systems – PFR in series and parallel, CSTRs in series and in parallel, mixed reactors in series.</p> <p>4. e. To be able to analyse multiple reactions – series, parallel and series-parallel. To be able to suggest reaction controls for desired product distribution.</p> <p>5. g. To be able to estimate heat effects of industrial reactions. To be able to suggest optimum temperature</p>

				progression.
28	CHPCT 504 B	Program Elective- I	2019	<p>. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability.</p> <p>2. An ability to recognition of the water treatment processes and control methodologies for air pollution. An ability to use different techniques for hazard waste treatment. Able to understand about removal of BOD, Chromium and Particulate matter.</p> <p>3. An ability to know about the main sources of different types of pollutions and control methods, Student can reach to reduce the pollution control aspects of fertilizer industries, petroleum refineries.</p> <p>4. An ability to know types of air pollution and their effect on vegetation, control methodologies for air pollution. Characteristics of municipal solid waste, its treatment methods.</p>
29	CHPCT 601	Chemical Reaction Engineering - II	2019	Residence time Distribution of fluid in Vessels, the F curve the C curve Relations.

				<p>Formulate a residence time distribution from tracer experiment results and use it to predict conversion in a non-ideal reactor.</p> <ol style="list-style-type: none"> Write reaction rate equations for common types of homogeneous and heterogeneous reactions. Physical adsorption and Chemical Adsorption. Identify the mechanisms involved in a heterogeneous reaction and formulate an effective rate equation. Calculate the impact of changing solid (or fluid) properties on the conversion of a heterogeneous reaction. Fluid particle non-catalytic reactions. unreacted core model for spherical particles, chemical reaction controls.
30	CHPCT602	Transport Phenomena	2019	<ol style="list-style-type: none"> Have the knowledge of derivations of the momentum, heat, mass flux distributions and also velocity, temperature, concentration distributions for various systems. Able to Solve continuity, Navier-Stokes and energy equations to analyze engineering problems related to Newtonian fluid flow laminar flow, Perform dimensionless forms of three transport phenomena. Educate about the formation and calculation of fluid friction in pipes, conduits and around sphere. Know the different types of heat transfer coefficients and

				<p>performance of liquid – liquid ejector. Have the knowledge of temperature, pressure dependence of viscosity, thermal conductivity and mass diffusivity.</p> <p>5. Understand the diffusion with homogeneous and heterogeneous chemical reaction.</p>
31	CHPCT603	Process Dynamics & Control	2019	<p>To be able to model physical systems/processes like thermometer / level systems / manometer. To have acquired the ability to study the response behavior of systems.</p> <p>2. To be able to suggest an appropriate controller for an application. To develop feed back control loops and reduce it to single block representation for further analysis.</p> <p>3. To be able to construct and analyze Routh array.</p> <p>4. To be able to obtain the locus of roots of a characteristic equation. To be able to make stability analysis-based frequency response (Bode plots) approach.</p> <p>5. To have learnt the basics of advanced control strategies. To have learnt controller tuning rules.</p>
32	MEHST604	Industrial Management	2019	<p>Understand the evolutionary development of management thought, general principles of management and concept of entrepreneurship.</p> <p>2. Able to identify and design plant location, plant layout,</p>

				<p>material handling systems and apply forecasting and PPC techniques to production systems.</p> <p>3. To realize the importance of significance of quality, manage quality improvement teams and identify requirements of quality improvement programs for various industries.</p> <p>4. Able to construct an operating characteristic curve for various sampling plans, construct and interpret various charts and apply quality improvement techniques in real world situations.</p> <p>5. Understand the philosophy and basic concepts of quality improvement, design, use, and interpret control charts for variables, attributes, and quality improvement techniques</p>
33	CHOET607	Open Elective – II Online	2019	<p>Able to understand classification, properties and the structures of Engineering materials.</p> <p>Able to have knowledge on Crystal imperfections.</p> <p>2. To learn various deformations regarding Creep, Fracture, Cold and Hot working. Able to understand Phase diagram and its applications. To learn various heat treatment process regarding Annealing, Quenching and Tempering.</p> <p>3. Able to understand the Mechanical and Electrical properties of Ceramic materials. Able to understand various</p>

				<p>forms of Composites.</p> <p>4. Able to learn various forms of Corrosion. Able to have knowledge on Corrosion prevention and control.</p>
34	CHPCT701	Plant Design & Process Economics	2019	<p>. Students will have knowledge to understand design considerations and engineering ethics. Students able to understand plant location, plant lay out, plant operation and control in a profitable way.</p> <p>2. Students able to design process flow diagrams, piping and instrumentation diagrams and vessel and piping layout.</p> <p>3. Students will have the knowledge on interest, time value of money and cash flow patterns useful for cost estimation.</p> <p>4. Students will have an idea on analysis of cost estimation involves capital investments, estimation of revenue, and cost indexes, students will come to know factors affecting investment and production costs.</p> <p>5. They will able to find out the alternate investments and replacements, it will also helps the students to understand profitability standards and methods for calculating profitability.</p>
35	CHPCP 704	Process Equipment Design & Drawing	2019	Distinguish between ethical and non ethical situations.

				<p>Practice moral judgment in conditions of dilemma.</p> <ol style="list-style-type: none"> 2. Relate the code of ethics to social experimentation. 3. Risk benefit analysis and reducing risk 4. Resolve moral responsibilities in complications. 5. Defend one's views in supporting the moral concerns. <p>Apply risk and safety measures in various engineering fields.</p>
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Chemical Engineering M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CHPC 01	Mathematics & Statistical Methods in Chemical Engineering	2019	<ol style="list-style-type: none"> 1. Students should be able to solve system of linear algebraic equations 2. Students should be able to do numerical integrations of functions. 3. Students should be able to fit relationship between two data sets using linear, non-linear regression. 4. Students should be able to calculate maxima/minima and functions
2	CHPC 02	Advanced Transport Phenomena	2019	<ol style="list-style-type: none"> 1. Understand the mechanism of momentum, heat and mass transport for steady and unsteady flow. 2. Perform momentum, energy and mass balances for a given system at macroscopic and microscopic scale. 3. Solve the governing equations to obtain velocity, temperature and concentration profiles. 4. Model the momentum, heat and mass transport under turbulent conditions.

				5. Develop analogies among momentum, energy and mass transport.
3	CHPE 11	Process Design & Synthesis	2019	<ol style="list-style-type: none"> 1. Analyze alternative processes and equipment 2. Synthesize a chemical process flow sheet that would approximate the real process 3. Design best process flow sheet for a given product 4. Perform economic analysis related to process design and evaluate project profitability
4	CHPE 12	Chemical Reactor Analysis	2019	<ol style="list-style-type: none"> 1. Evaluate heterogeneous reactor performance considering mass transfer limitations 2. Perform the energy balance and obtain concentration profiles in multiphase reactors. 3. Estimate the performance of multiphase reactors under non-isothermal conditions
5	CHPE 13	Fluidization Engineering	2019	<ol style="list-style-type: none"> 1. Performing and understanding the behavior fluidization in fluidized bed 2. Evaluate the characterization of particles and power consumption in fluidization regimes 3. Understanding the applicability of the fluidized beds in chemical industries
6	CHPE 14	Process Plant Simulation	2019	<ol style="list-style-type: none"> 1) Modeling Aspects and Classification of Mathematical Modeling 2) How to Prepare Models from Mass Transfer and Models on Heat Transfer 3) How to Prepare Models from Fluid Flow and Models

				<p>on Reaction Engineering</p> <p>4) The analysis through Propagation of Errors, Error Methods, Data Regression Methods and Process Simulation</p> <p>5) Decomposition of Networks and Convergence Promotion</p>
7	CHPE 21	Industrial Pollution Control	2019	<ol style="list-style-type: none"> 1. Recognize the causes and effects of environmental pollution 2. Analyze the mechanism of proliferation of pollution 3. Develop methods for pollution abatement and waste minimization 4. Design treatment methods for gas, liquid and solid wastes
8	CHPE 22	Applications of Nanotechnology in Chemical Engineering	2019	<ol style="list-style-type: none"> 1. Understanding the different top down and bottom up approaches for nanoparticles. 2. the different applications of nanoparticles in chemical engineering field. 3. Learning the characterization techniques for nanoparticles
9	CHPE 23	Chemo-informatics	2019	<ol style="list-style-type: none"> 1. The course will introduce the students preparing for professional work in chemistry must learn how to retrieve specific information from the enormous and rapidly expanding chemical literature. 2. The course will provide a broad overview of the computer technology to chemistry in all of its manifestations. 3. The course will expose the student to current and relevant applications in QSAR and Drug Design.
10	CHPE 24	Advanced Control Systems	2019	<ol style="list-style-type: none"> 1) Feed Forward, Ratio Controls and Advanced Controllers 2) Control Loop Interactions & Optimization 3) Digital Computer Control, selection of sampling

				<p>period, comparison of analog and digital filters</p> <p>4) Finite Difference Models, Z-Transforms, Pulse Transfer Functions</p> <p>5) Samples and Data Control Systems</p>
11	CHPP 01	Computational Techniques Lab	2019	1. Use numerical methods for various manipulations and be capable of implementing them on a computing system
12	PGMC 41	Research Methodology & IPR	2019	<p>Understand research problem formulation. - Analyze research related information - Follow research ethics - Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</p> <p>Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.</p> <p>Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.</p>
13	PGPA 11	English For Research Paper Writing	2019	<p>1) Applies the concepts of diffusion mass transfer, mass transfer coefficients, convective mass transfer, inter-phase mass transfer, equipment for gas-liquid operations</p> <p>2) Suggest and design equipment for various mass transfer operations</p> <p>3) Study of the stage wise mass transfer operations, principles of various stage wise contact processes like distillation</p> <p>4) Student will be able to select a separation process for a particular system.</p>

				5) Able to understand the energy requirements of separation processes
14	PGPA 12	Disaster Management	2019	<ol style="list-style-type: none"> 1) learn the importance of RTD and Non-ideal flow in reacting vessels. 2) Calculate the conversions based on segregated flow model, dispersion model and tanks-in- series models. 3) Understand the diffusion and reaction in a porous catalyst. 4) Learn the factors influencing catalyst decay, the role of pore diffusion on catalyst activity rate. 5) Understand the design of heterogeneous catalytic reactors.
15	CHPE 31	Modern Concepts in Catalysis & Surface Phenomenon	2019	<ol style="list-style-type: none"> 1. To understand the concepts of homogenous and heterogeneous catalysis, with specific examples. 2. To study reaction mechanisms and kinetics of homogenous and heterogeneous catalytic reactions. 3. To familiarize with the characterization of catalysts 4. To understand the application and mechanisms of several types of catalysts in chemical industry.
16	CHPE 32	Advanced Downstream Processing	2019	<ol style="list-style-type: none"> 1. To learn effective strategies of downstream processing in chemical industry. 2. Understand the role of downstream processing. 3. Analyze reactors, upstream and downstream processes in production
17	CHPE 33	Computational Fluid Dynamics	2019	<ol style="list-style-type: none"> 1. Understand the basic principles of mathematics and numerical concepts of fluid dynamics. 2. Develop governing equations for a given fluid flow system. 3. Adapt finite difference techniques for fluid flow models.

				<p>4. Apply finite difference method for heat transfer problems.</p> <p>5. Solve computational fluid flow problems using finite volume techniques.</p>
18	CHPE 34	Enzyme Science & Engineering	2019	<p>1) Know the mechanisms of Chemical and Enzyme Catalysts</p> <p>2) Develop, understand and apply Kinetic Models</p> <p>3) Formulate and Analyze Immobilized Enzyme Kinetics</p> <p>4) Design and analyze Enzyme Reactors</p> <p>5) Gain knowledge on Applications of Enzyme and on Biosensors</p>
19	CHPE 35	Optimization Theory & Practice	2019	<p>1) formulate and analyse the optimization of the given physical situation.</p> <p>2) Apply different methods of optimization and to suggest a technique for specific problem</p> <p>3) Understand the difference between constrained and unconstrained optimization</p> <p>4) Understand the importance of linear programming problems</p> <p>5) Realize the importance of optimization by understanding different examples</p>
20	CHPE 36	Micro and Nano Fluidics	2019	<p>1. Introduce students to the physical principles to analyze fluid flow in micro and nano-size devices. It unifies the thermal sciences with electrostatics, electrokinetics, colloid science; electrochemistry; and molecular biology.</p>
21	CHPE 37	Process Intensification	2019	<p>1. Assess the values and limitations of process intensification, cleaner technologies and waste minimization options.</p> <p>2. Measure and monitor the usage of raw materials and wastes generating from production and frame the strategies for reduction, reuse and recycle.</p> <p>3. Obtain alternative solutions ensuring a more sustainable future based on environmental protection,</p>

				<p>economic viability and social acceptance.</p> <p>4. Analyze data, observe trends and relate this to other variables.</p> <p>5. Plan for research in new energy systems, materials and process intensification.</p>
22	CHPE 41	Phase Transitions in Process Equipment	2019	<p>1. The student is expected to obtain considerable insight into various types of phase transitions, and how these can be described theoretically in different ways</p> <p>2. Predict relationships between physical quantities using the laws and methods of thermodynamics.</p> <p>3. Find probabilities and thermal quantities (free energy, entropy, etc) given the energy eigen values of a system.</p> <p>4. The student is expected to obtain considerable insight into various types of phase transitions, and how these can be described theoretically in different ways</p> <p>5. Predict relationships between physical quantities using the laws and methods of thermodynamics.</p> <p>6. Find probabilities and thermal quantities (free energy, entropy, etc) given the energy eigen values of a system.</p>
23	CHPE42	Process Integration	2019	<p>1. Maximum heat recovery for a given process (both new processes, and retrofit of existing processes) identify opportunities for integration of high-efficiency energy.</p> <p>2. Energy-intensive thermal separation operations (distillation, evaporation) at an industrial process site.</p> <p>3. Evaluate the process integration measures with respect to energy efficiency, greenhouse gas emissions and economic performance</p>

24	CHPE 43	Transport in Porous Media	2019	<ol style="list-style-type: none"> 1. Students will understand the mechanisms involved in transport processes in porous media and will be able to work with the equations that govern the fate and transport of gas, water and solutes in porous media.
25	CHPE 44	Microflow Chemistry & Process Technology	2019	<ol style="list-style-type: none"> 1. Students will understand the role of micro flow chemistry and process technology in chemical engineering. 2. The student is expected to obtain considerable insight into various types of micro reactors.
26	CHPE 45	Process Plant Design & Flow sheeting Tools	2019	<ol style="list-style-type: none"> 1. Analyze, synthesize and design processes for manufacturing products commercially 2. Integrate and apply techniques and knowledge acquired in other courses such as thermodynamics, heat and mass transfer, fluid mechanics, instrumentation and control to design heat exchangers, plate and packed columns and engineering flow diagrams 3. Use commercial flow sheeting software to simulate processes and design process equipment 4. Recognize economic, construction, safety, operability and other design constraints 5. Estimate fixed and working capitals and operating costs for process plants
27	CHPE 46	Process Synthesis & Analysis	2019	<ol style="list-style-type: none"> 1) understand the concepts of Engineering economics 2) Able to estimate various costs involved in a process industry and evaluate the tax burden of an establishment 3) Able to estimate profitability of a company 4) Understand the heat exchanger networks and their importance in industry 5) Compute break even period for an investment and rate of return
28	CHPE 47	Membrane Separations	2019	<ol style="list-style-type: none"> 1) Knowledge on Preparation and Characterization of Materials and Types of Membrane

				<p>2) Knowledge on Nano-Filtration, Ultra-Filtration and Micro-Filtration</p> <p>3) Knowledge on Designing Reverse Osmosis and Dialysis</p> <p>4) Concepts of Gas Separation and Pervaporation and Design of Pervaporation Module</p> <p>5) Knowledge on Ion Exchange Membrane Process, Liquid Membranes and Other Membrane Processes</p>
29	CHPP 02	Advanced Chem. Engg. Lab	2019	1. to design and perform Chemical Engineering related experiments
30	CHPE 51	Design of experiments and parameter estimation	2019	<p>1. Plan experiments for a critical comparison of outputs</p> <p>2. Include statistical approach to propose hypothesis from experimental data</p> <p>3. Implement factorial and randomized sampling from experiments</p> <p>4. Estimate parameters by multi-dimensional optimization</p>
31	CHPS 02	Seminar – II	2019	<p>1. Plan experiments for a critical comparison of outputs</p> <p>2. Include statistical approach to propose hypothesis from experimental data</p> <p>3. Implement factorial and randomized sampling from experiments</p> <p>4. Estimate parameters by multi-dimensional optimization</p>
32	CHPE 51	Design of Experiments & Parameter Estimation	2019	<p>1. Plan experiments for a critical comparison of outputs</p> <p>2. Include statistical approach to propose hypothesis from experimental data</p> <p>3. Implement factorial and randomized sampling from experiments</p>

				4. Estimate parameters by multi-dimensional optimization
33	CHPE 52	Computer Aided Design	2019	<p>1. Students get the knowledge about computer Aided Flow Sheet Synthesis</p> <p>2. Computer aided equipment design of Evaporators; Distillation columns; Reactors, adsorption columns</p>
34	CHPE 53	Cleaner Production	2019	<p>1. Explain the concept and principles of cleaner production.</p> <p>2. Suggest different unit operations in industrial production process to minimize pollutions.</p> <p>3. Plan good housekeeping practices for Industry/other places with concern of safety, hygiene and waste reduction.</p> <p>4. Suggest basic methods and techniques of pollution prevention during production.</p> <p>5. Suggest cleaner production methods for a given situation which will also lead to cost reduction in long run</p>
35	CHPE 54	Fuel Cell Systems	2019	<p>1) Classify Fuel Cells, and understand factors affecting efficiency of electrochemical energy</p> <p>2) Construct, operate AFC & MCFC</p> <p>3) Gain knowledge on manufacturing and materials, environmental impacts and applications of PAFC & SOFC</p> <p>4) Gain knowledge on electrode- oxidation of methanol and crossover to DMF and Engineering Aspects</p> <p>5) Gain knowledge on Technological and Economical Challenges on PEMFC</p>
36	CHPE 56	Bioprocess Engineering	2019	1. Understand the different cells and their use in

				<p>biochemical processes.</p> <p>2. Understand the role of enzymes in kinetic analysis of biochemical reaction.</p> <p>3. Analyze bioreactors, upstream and downstream processes in production of bio-products</p> <p>4. Demonstrate the fermentation process and its products for the latest industrial revolution</p>
37	PGOP 11	Business Analytics	2019	<p>1. Students will demonstrate knowledge of data analytics.</p> <p>2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.</p> <p>3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.</p> <p>4. Students will demonstrate the ability to translate data into clear, actionable insights.</p>
38	PGOP 13	Operations Research	2019	<p>1. Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis</p> <p>4. Student should able to model the real world problem and simulate it.</p>
39	PGPA 13	SANSKRIT FOR TECHNICAL	2019	<p>1. Understanding basic Sanskrit language</p>

		KNOWLEDGE		<p>2. Ancient Sanskrit literature about science & technology can be understood</p> <p>3. Being a logical language will help to develop logic in students</p>
40	PGPA 14	Value Education	2019	<p>1.Knowledge of self-development</p> <p>2.Learn the importance of Human values</p> <p>3.Developing the overall personality</p>
41	PGPA 21	CONSTITUTION OF INDIA	2019	<p>1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.</p> <p>2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</p> <p>3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</p> <p>4. Discuss the passage of the Hindu Code Bill of 1956.</p>
42	PGPA 22	PEDAGOGY STUDIES	2019	<p>1.What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</p> <p>2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</p> <p>3. How can teacher education (curriculum and practicum)</p>

				and the school curriculum and guidance materials best support effective pedagogy?
43	PGPA 23	STRESS MANAGEMENT BY YOGA	2019	1. Develop healthy mind in a healthy body thus improving social health also 2. Improve efficiency
44	PGPA 24	PERSONALITY DEVELOPMENT THROUGH LIFE ENHANCEMENT SKILLS	2019	1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life 2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity 3. Study of Neetishatakam will help in developing versatile personality of students.

Civil Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MABST 101	Mathematics – I	2019	1. analyze differential equations and solve them 2. apply differential equations to engineering problems. 3. use transformation to convert one type into another type presumably easier to solve. 4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients. 5. solve an initial value problem for an nth order ordinary differential equation using the

				<p>Laplace transform.</p> <p>6. expand functions as power series using Maclaurin's and Talor's series</p> <p>7. optimize the problems related to OR, Computer science, Probability and Statistics</p> <p>8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc using curve tracing method to find length, area, volume.</p> <p>9. use multiple integral in evaluating area and volume of any region bounded by the given curves.</p>
2	CYBST 102	Engineering Chemistry	2019	<p>1. analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. □</p> <p>□ 2. rationalise bulk properties and processes using thermodynamic considerations. □</p> <p>3. distinguish the ranges of the electromagnetic spectrum used for exciting different</p> <p>□ molecular energy levels in various spectroscopic techniques □</p> <p>4. rationalise periodic properties such as ionization potential, electronegativity,</p> <p>□ oxidation states and electronegativity. □</p> <p>5. list major chemical reactions that are used in the synthesis of molecules. □</p>
3	ENHST 103	English	2019	<p>1. learn the elements of grammar and composition of English Language.</p> <p>2. Learn literary texts such as Short stories and prose passages.</p> <p>3. maintain linguistic competence through training in</p>

				<p>vocabulary, sentence structures and pronunciation.</p> <p>4. develop communication skills by cultivating the habit of reading comprehension passages.</p> <p>5. develop the language skills like listening, speaking, reading and writing.</p> <p>6. make use of self-instructed learner friendly modes of language learning through competence.</p>
4	EEEST 104	Basic Electrical & Electronics Engineering	2019	<p>1. understand the basic concepts of D.C. single phase and 3- phase supply and circuits and solve basic electrical circuit problems</p> <p>2. understand the basic concepts of transformers and motors used as various industrial drives</p> <p>3. understand the concept of power factor improvement for industrial installations and concepts of most economical power factor</p> <p>4. understand the operation and characteristics of diodes, transistors, integrated circuits and digital circuits</p>
5	MEEST 105	Engineering Graphics & Design	2019	<p>1. make a distinction between first angle projection and third angle projection of drawing.</p> <p>2. draw hyperbola, parabola, Involute and Cycloidal curves.</p> <p>3. draw sections of solids including cylinders, cones, prisms and pyramids.</p> <p>4. draw projections of lines, planes, solids and sections of solids.</p> <p>5. draw orthographic projections of lines, planes, and solids.</p>

6	ENHSP 106	English Communication Lab	2019	The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
7	MABST 201	Mathematics – II	2019	<ol style="list-style-type: none"> 1. use ranks of matrices to decide whether the system of linear equations is consistent or not 2. use Cayley-Hamilton theorem to find inverses or powers of matrices. 3. use Eigen values and vectors to reduce Quadratic forms to normal form. 4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications. 5. use Green's theorem to evaluate line integrals along simple closed contours on the plane 6. use Stokes' theorem to give a physical interpretation of the curl of a vector field 7. use the divergence theorem to give a physical interpretation of the divergence of a vector field. 8. find the Fourier Series to represent a function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic phenomenon. 9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions. 10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena
8	PYBST 202	Engineering Physics	2019	<ol style="list-style-type: none"> 1. develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses 2. understand the quantum mechanics and ultimately the quantum behaviour of charged particles when they

				<p>are in motion.</p> <p>3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems</p> <p>4. apply the basic principles of Mechanics of rigid body and continuous media and their applications</p> <p>5. understand the principles in electrostatics and electromagnetics and magnetic properties of materials.</p> <p>6. understand size depended properties of nanodimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices.</p> <p>7. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.</p>
9	CSEST 203	Programming for Problem solving	2019	<p>1. Learn about fundamentals of computer and programming language, draw flow chart to solve given problem logically and develop algorithm to solve given program</p> <p>2. Able to use the concept of branching and looping to design efficient C program and be able to apply the concepts of user defined function and recursion to support reusability</p> <p>3. Able to discuss basic algorithmic analysis for simple algorithms; determine appropriate algorithmic approaches to a real world problems.</p>

				<p>4. Apply fundamental programming concepts, using a functional programming language, to solve problems.</p> <p>5. Design and develop a modular program in C for commercial billing activities using an array of structures and pointers.</p>
10	CEEST 204	Engineering Mechanics	2019	<p>1. apply the basic knowledge of force system.</p> <p>2. know the types of supports occur in civil engineering structures</p> <p>3. know the geometrical properties of different cross sections.</p> <p>4. understand different types of stresses and strains, elastic constants.</p> <p>5. understand the behavior of different internal forces under different types of loading</p>
11	MEESP 205	Workshop/Manufacturing Practices	2019	<p>Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.</p>
12	CSESP 206	Computer Programming Lab	2019	<p>1. formulate simple algorithms for arithmetic and logical problems.</p> <p>2. translate the algorithms to programs (in C language).</p> <p>3. test and execute the programs and correct syntax and logical errors.</p> <p>4. implement conditional branching, iteration and recursion.</p> <p>5. decompose a problem into functions and synthesize a</p>

				<p>complete program using divide and conquer approach.</p> <p>6. use arrays, pointers and structures to formulate algorithms and programs. □</p> <p>7. apply programming to solve matrix addition and multiplication problems and searching and sorting problems. and □</p>
13	CEMCT 207	Environmental Science	2019	<p>1. acquire knowledge in</p> <ul style="list-style-type: none"> • diverse components of environment and natural resources • ecosystem and biodiversity & its conservation methods • population growth and human health • green technology <p>2. identify and resolve the issues related to sources of different types of pollutions</p> <p>3. provide solutions to individuals, industries and government for sustainable development of natural resources</p> <p>4. apply environmental ethics in protection of diversified ecosystems.</p>
14	MABST 301	Mathematics – III	2019	<p>1. Solve field problems in engineering involving PDEs.</p> <p>2. They can also formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.</p>
15	CEPCT 302	Strength of Materials	2019	<p>1) Develop shear force and bending moment diagrams for different load cases</p> <p>2) Compute the flexural stresses for different load cases and different cross-sections</p>
16	CEPCT 303	Surveying	2019	<ul style="list-style-type: none"> • Measure and layout elevations and relative position of points, understand plans and field notes. • Perform computations using information

				<p>gathered from differential levelling, traversing, area calculations, and volume/ earthwork.</p> <ul style="list-style-type: none"> • Ability to design and set out curves • Ability to use modern surveying equipment • Calculate angles, distances and levels • Identify data collection methods and prepare field notes • Understand the working principles of survey instruments • Estimate measurement errors and apply corrections • Interpret survey data and compute areas and volumes
17	CEPCT 304	Building Materials and Construction Technology	2019	<ul style="list-style-type: none"> • To find the suitability various building materials at a particular location in the building construction. • To know the preparation of concrete and tests to be performed • Ability to utilize various modern building materials like timber products, protective coatings, and fibre textiles • Able to know the different types of concretes their application, mix design and tests. • To develop acquaintance over service requirements like protectives, damp and termite proofing. • Able to repair and rehabilitation of distressed structures and use of construction equipment in the field.
18	MEEST 305	Basic Mechanical Engineering	2019	Understand basics of thermodynamics and components of thermal plant

				<p>2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice.</p> <p>3. Understand basics of heat transfer, refrigeration and internal combustion engines.</p> <p>4. Understand mechanism of power transfer through belt, chain, rope and gear drives.</p> <p>5. Understand functions and operations of machine tools including milling, grinding, and shaping machines.</p>
19	CEPCT 306	Engineering Geology	2019	<p>1. To apply the geological knowledge to Civil Engineering Constructions, at different stages. The kind of study exposes the geological draw backs, if any.</p> <p>2. To help the site engineers to take suitable precautionary measures to overcome the drawbacks but also to take advantage of the site geology findings wherever possible.</p> <p>3. To take precautionary measures in civil engineering constructions based on geological parameters.</p>
20	CEPCP 307	Surveying Lab	2019	<p>1. Ability to use the techniques, skill and surveying equipment for engineering practice.</p> <p>2. Applying mathematics concepts in the field of surveying.</p> <p>3. Develop an understanding of modern surveying equipment</p>
21	CEPCP 308	Engineering Geology Lab	2019	<p>1. The study and identification of minerals, rocks and structures with their utilization in civil engineering works</p>
22	PAMCT 401	Constitution of India	2019	<p><input type="checkbox"/> Understand historical background of the constitution making and its importance for building a democratic India.</p> <p><input type="checkbox"/> Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.</p> <p><input type="checkbox"/> Understand the value of the fundamental rights and</p>

				<p>duties for becoming good citizen of India.</p> <ul style="list-style-type: none"> □ Analyze the decentralization of power between central, state and local self-government. □ Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy. <ol style="list-style-type: none"> 1. Know the sources, features and principles of Indian Constitution. 2. Learn about Union Government, State government and its administration. 3. Get acquainted with Local administration and Pachayati Raj. 4. Be aware of basic concepts and developments of Human Rights. 5. Gain knowledge on roles and functioning of Election Commission
23	MABST 402	Mathematics – IV	2019	<ul style="list-style-type: none"> ● evaluate approximating the roots of polynomial and transcendental equations by different algorithms ● Apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations ● apply discrete and continuous probability distributions ● design the components of a classical hypothesis test <p>infer the statistical inferential methods based on small and large sampling tests</p>
24	CEPCT 404	Structural Analysis	2019	<ul style="list-style-type: none"> ● Understand various engineering properties of materials ● Estimate magnitudes under combined loads in

				<p>members and structures</p> <ul style="list-style-type: none"> ● Determine shear stresses for different cross-sections. ● Determine deflection at any point on a beam under simple or combined loads ● Apply failure criteria to implement in design of structural members. ● Analyze members under torsion, combined torsion and bending moment for determination of energy absorption
25	CEPCT 405	Environmental Engineering	2019	<ol style="list-style-type: none"> 1. Able to estimate the water demand and classify the various sources of water. 2. Able to explain the water quality characteristics and types of conduits used for carrying of water 3. Able to design the water treatment plant units
26	CEPCT 406	Soil Mechanics	2019	<ul style="list-style-type: none"> ● Identify various soils based on their characteristics. ● Evaluate permeability and seepage of soils. ● Determine compaction characteristics of soils. ● Calculate consolidation time and settlement of soils. ● Determine Shear Characteristics of soils
27	CEPCD 407	Computer aided Building Drawing	2019	<ul style="list-style-type: none"> ● Develop drawing skills for effective demonstration of building details. ● Draw building plans using Computer Aided Design and Drafting software's. ● Develop engineering project drawings incorporating details and design parameters in 2D & 3D. ● Examine efficacy of CAD design.
28	CEPCP 408	Fluid Mechanics and Hydraulic Machines Lab	2019	<ul style="list-style-type: none"> • Able to determine types of flow • Able to calibrate the flow measuring devices

				<ul style="list-style-type: none"> • Able to draw performance characteristic curves
29	CEESP 409	Materials Testing Lab	2019	<ol style="list-style-type: none"> 1. acquire the knowledge and behavior in finding the properties of different materials.
30	CEPCT 501	Hydraulic Engineering	2019	<ol style="list-style-type: none"> 1. Able to find out drag and lift forces on submerged bodies 2. Able to analyze flow through pipes 3. Able to determine the economical sections 4. Able to classify the GVF profiles, RVF profiles and their characteristics
31	CEPET 502	Advanced Environmental Engineering	2019	<ol style="list-style-type: none"> 1. Able to characterize sludge and explain about different types of tertiary treatment of wastewater. 2. Able to explain about different methods of disposal of wastewater. 3. Able to explain about different types of air pollutants, its effects and controlling measures. 4. Able to apply measures for noise pollution 5. Able to manage Municipal Solid Waste.
32	CEPCT 503	Foundation Engineering	2019	<ul style="list-style-type: none"> • Assess stability of slopes and Earth Pressures. • Determine safe bearing capacity and settlement of shallow foundations. • Calculate load carrying capacity of piles. • Determine the well staining thickness
33	CEPET 504	Remote Sensing and GIS	2019	<ul style="list-style-type: none"> • Comparing with ground, air and satellite based sensor platforms. • Interpret the aerial photographs and satellite imageries. • Create and input spatial data for GIS application. • Apply RS and GIS concepts in water resources engineering.

				<ul style="list-style-type: none"> ● Applications of various satellite data.
34	CEPCT 505	Reinforced Concrete Design	2019	<ol style="list-style-type: none"> 1. Understand the basic concepts of working stress and limit state design methods 2. Design various RC elements like beams, columns, footings and slabs. 3. Apply design concepts to complex structural systems in advanced courses.
35	CEPCT 506	Design of Steel Structures	2019	<ol style="list-style-type: none"> a. Explain relevant IS codes b. Analysis and design of flexural members and detailing c. Design compression members of different types with connection detailing d. Design Plate Girder and Gantry Girder with connection detailing
36	CEPCP 507	Hydraulic Engineering Lab	2019	<ol style="list-style-type: none"> 1 Able to compute losses in pipe flow 2 Able to determine characteristics of gradually varied flow and hydraulic jump
37	CEPCP 508	Soil Mechanics Lab	2019	<ul style="list-style-type: none"> ● Identify various soils based on their characteristics. ● Evaluate permeability and seepage of soils. ● Determine plasticity characteristics of various soils.
38	CEPCT 601	Hydrology and Water Resources Engineering	2019	<ol style="list-style-type: none"> 1. Able to calculate to mean precipitation 2. Able to prepare DAD and IDF curves 3. Able to develop flood hydrograph 4. able to compute flood magnitude and route of floods through reservoir and streams 5. Able to compute yield of well 6. To determine the irrigation water requirement and

				design of irrigation canals
39	CEPCT 602	Transportation Engineering	2019	<ol style="list-style-type: none"> 1. Estimate the requirements and design highway pavements. 2. Apprehend different components of Railways, Airports and Harbours.
40	CEOET 603	Open Elective – I	2019	<ul style="list-style-type: none"> • Understand various ingredients of concrete and their role. • Examine knowledge on the fresh and hardened properties of concrete. • Design concrete mixes using various methods. • Perceive special concretes for accomplishing performance levels.
41	CEPET 604	Programme Elective – III	2019	<ul style="list-style-type: none"> • Choose appropriate soil exploration method • Suggest suitable ground improvement methods. • Design bracing systems and Sheet pile walls • Design suitable foundations on expansive soils
42	CEPCP 606	Environmental Engineering Lab	2019	<ol style="list-style-type: none"> 1. Able to Perform common environmental experiments relating to water quality and wastewater characteristics 2. Able to Statistically analyze and interpret laboratory results 3. Demonstrate good written and oral communication skills
43	CEPCP 607	Transportation Engineering Lab	2019	<ol style="list-style-type: none"> 1. Able to perform various tests for selection of various materials used in highway construction
44	MGHST 608	Management(Organizational Behaviour)	2019	<ol style="list-style-type: none"> 1. Understand the Nature of Management; 2. Identify and Describe the Functions of Management; 3. Understand the Social Responsibilities of Business; and 4. Appreciate the Interests of Various Stakeholders in

				the Business.
45	CEPCT 701	Estimation & Costing	2019	<ul style="list-style-type: none"> ● Understand basics on methods and types of estimation. ● Formulate specifications and tender documents. ● Prepare contract agreements ● Determine rate analysis of different items. ● Valuation of buildings.
46	CEOET 702(a)	Watershed Management	2019	<ul style="list-style-type: none"> • Able to explain about Rainfall-Runoff analysis and estimation and design of storm • Able to do the effective watershed management methods and optimization • Able to understand about different soil conservation equations and principles • Able to apply the knowledge of water harvesting techniques and artificial recharge techniques
47	CEOET 702(b)	Environment Impact Assessment	2019	<ul style="list-style-type: none"> ● Prepare EMP, EIS, and EIA report. ● Identify the risks and impacts of a project. ● Choose an appropriate EIA methodology. ● Evaluation the EIA report. ● Estimate the cost benefit ratio of a project. <p>Know the role of stakeholder and public hearing in the preparation of EIA.</p>
48	CEHST 704	Professional Practice, Law & Ethics	2019	<ol style="list-style-type: none"> 1. To develop some ideas of the legal and practical aspects of their profession 2. To understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession.
49	CEPCI	Industry Internship	2019	<ol style="list-style-type: none"> 1. To enable the students to acquire practical

	705			<p>knowledge.</p> <p>2. Capable of carrying out Civil Engineering works in the field.</p>
50	CEPCX 706	Project Work - Phase I	2019	<p>1. To enable the students to work in convenient group</p> <p>2. Capable of doing a project involving theoretical and experimental studies.</p> <p>3. Modern trend and technology in civil engineering</p>
51	CEOET 801	Finite Element Methods	2019	<ul style="list-style-type: none"> ● Develop finite element formulations of 1D & 2D problems. ● Solve complex problems using FEM. ● Formulate isoparametric elements with different irregular boundaries. ● Implement solution techniques for higher order problems in practice. ● Apply concepts for carrying out research. ● Apply concepts for modelling of non-linear materials and geometry.
52	CEPET 802	Water Resources System Analysis	2019	<ul style="list-style-type: none"> ● Apply basic principles of system approach. ● Judging Economics of water resources of multipurpose projects. ● Apply optimization principles to single and multi crop applications. ● Designing reservoir operation leading to optimum crop water application.
53	CEPCX 803	Project Work - Phase II	2019	<p>1. To enable the students to work in convenient group</p> <p>2. Capable of doing a project involving theoretical and experimental studies.</p> <p>3. Modern trend and technology in civil engineering</p>

Civil Engineering M.Tech (Structural Engineering)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SEPC01	Advanced Structural Analysis	2019	<ol style="list-style-type: none">1. Analysis the structures due to the effects of settlements and temperature changes.2. Analyze the skeleton structures using stiffness analysis code.3. Use direct stiffness method understanding its limitations4. Study the fundamentals of FEM
2	SEPC02	Advanced Solid Mechanics	2019	<ol style="list-style-type: none">1. Solve simple problems of elasticity and plasticity understanding the basic concepts.2. Apply numerical methods to solve continuum problems.3. Study the two-dimensional problems of Elasticity.4. Solving the tensional problem of prismatic beam.5. Solve the problems of plasticity understanding the basic concepts.
3	SEPE11	Theory of Thin Plates and Shells	2019	<ol style="list-style-type: none">1. Use analytical methods for the solution of thin plates and shells.

				<p>2. Use analytical methods for the solution of shells.</p> <p>3. Apply the numerical techniques and tools for the complex problems in thin plates.</p> <p>4. Apply the numerical techniques and tools for the complex problems in shells.</p>
4	SECP01	Structural Design Lab	2019	<p>1. Design and Detail all the Structural Components of Frame Buildings.</p> <p>2. Design and Detail complete Multi-Storey Frame Buildings.</p>
5	SECP02	Advanced Solid Mechanics Lab	2019	<p>1. Diagnosis the distress in the structure understanding the causes and factors.</p> <p>2. Assess the health of structure using static field methods.</p> <p>3. Assess the health of structure using dynamic field tests.</p> <p>4. Suggest repairs and rehabilitation measures of the structure.</p>
6	PGPA12	Disaster Management	2019	<p>1. demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.</p> <p>2. critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.</p> <p>3. develop the standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.</p> <p>4. critically understand the strengths and weaknesses of disaster management approaches, planning and</p>

				programming in different countries, particularly their home country or the countries they work in.
7	PGPA41	Research Methodology and IPR	2019	<ol style="list-style-type: none"> 1. Understand research problem formulation. 2. Analyze research related information 3. Follow research ethics 4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5. Understand that when IPR would take such important place in growth of individuals & Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. 6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
8	SEPC03	FEM in Structural Engineering	2019	<ol style="list-style-type: none"> 1. Use Finite Element Method for structural analysis. 2. Execute the Finite Element Program/ Software. 3. Solve continuum problems using finite element analysis. 4. Develop the FEM software.
	SEPC04	Structural Dynamics	2019	<ol style="list-style-type: none"> 1. Analyze and study dynamics response of single

9				<p>degree freedom system using fundamental theory and equation of motion.</p> <p>2. Analyze and study dynamics response of Multi degree freedom system with lumped parameter using fundamental theory and equation of motion.</p> <p>3. Analyze and study dynamics response of Multi degree freedom system with distributed man and load.</p> <p>4. Study the concepts of dynamic effects due to wind loading, moving loading & vibrations caused by Traffic, Blasting & Pile driving.</p> <p>5. Use the available software for dynamic analysis.</p>
10	SEPE31	Advanced Steel Design	2019	<p>1. Analyse, design and detail Transmission/ TV tower, Mast and Trestles with different loading conditions.</p> <p>2. Analyse, design and detail the RC and Steel Chimney.</p> <p>3. Analyse. design and detail the tall buildings subjected to different loading conditions using relevant codes.</p> <p>4. Analysis and design of dynamic approach OF STRUCTURAL DESIGN USING is Code provisions.</p>
11	SEPE32	Design of Formwork	2019	<p>2. Design deep beams and corbels</p> <p>3. Design of shear walls using IS, ACI & Errocode.</p> <p>4. Analyse the special structures by understanding their behaviour in torsional buckling.</p>

				5. Design and prepare detail structural drawings for execution citing relevant IS codes.
12	SECP03	Core Lab III Model Testing Lab	2019	1. Plan the test set-up for model testing 2. Understand the behavior of structural components.
13	SECP04	Core Lab IV Numerical Analysis Lab	2019	1 Find Roots of non-linear equations by Bisection method and Newton's method. 2 Do curve fitting by least square approximations by using matlab 3 Solve the system of Linear Equations using Gauss - Elimination/ Gauss - Seidal Iteration/ Gauss - Jordan Method 4 To Integrate Numerically Using Trapezoidal and Simpson's Rules 5 To Find Numerical Solution of Ordinary Differential Equations by Euler's Method, Runge- Kutta Method
14	SEPE51	Design of Pre-stressed Concrete Structures	2019	1. Find out losses in the pre-stressed concrete. Understand the basic aspects of pre-stressed concrete fundamentals, including pre and post-tensioning processes. 2. Analyse pre-stressed concrete deck slab and beam/ girders. 3. Design pre-stressed concrete deck slab and beam/ girders.

				4. Design of end blocks for pre-stressed members.
15	SEPE52	Analysis of Laminated Composite Plates	2019	<ol style="list-style-type: none"> 1. To list out important legislations related to health, Safety and Environment. 2. To list out requirements mentioned in factories act for the prevention of accidents. 3. To understand the health and welfare provisions given in factories act.
16	SEOE12	Industrial Safety	2019	<ol style="list-style-type: none"> 1. To list out important legislations related to health, Safety and Environment. 2. To list out requirements mentioned in factories act for the prevention of accidents. 3. To understand the health and welfare provisions given in factories act.

Civil Engineering M.Tech (Geotechnical Engineering)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	GTPC01	Advanced Soil Mechanics	2019	<ol style="list-style-type: none"> 1. The students obtain the complete knowledge on Strength and Compressibility of soil mass of soil mass. 2. To learn importance of stress paths on strength Characteristics. 3. The students are able to develop mathematical models for solving different problems in soil mechanics using critical state frame work.

2	GTPC02	Advanced Foundation Engineering	2019	<ol style="list-style-type: none"> 1. The students will be able to analyse and proportion shallow foundation. 2. To learn load transfer mechanisms and proportioning of deep foundations. 3. To comprehend design aspects of foundations in problematic soils 4. The students will be able to assess the type of foundations to be recommended for construction design of coffer dams.
3	GTPE11	Soil Structure Interaction	2019	<ol style="list-style-type: none"> 1. The student is exposed to soil foundation interaction behavior 2. The student learns analysis of structures using soils modeling soil as elastic half space and discretizes springs. 3. The student will be able to analyse settlements and load distributions in piles and pile groups subjected to vertical and lateral loads.
4	GTPE12	Ground Improvement Techniques	2019	<ol style="list-style-type: none"> 1. Assess the site or ground conditions and judge for adopting ground improvement techniques for a particular structure and site conditions. 2. Select suitable compaction techniques or stabilization methods for improving engineering properties of soils in shallow layers. 3. To modify ground conditions by freezing and thermal methods. 4. Select suitable reinforced earth methods for stabilizing soils in retaining walls and slopes.
5	GTPE13	Pavement Analysis and Design	2019	<ol style="list-style-type: none"> 1. Assess the factors affecting the performance of pavements.

				<ul style="list-style-type: none"> 2. Identifying failure criteria and design flexible and rigid pavements. 3. Compare and select suitable pavement design approaches, overlays, and design aspects.
6	GTPE22	Environmental Geotechnology	2019	<ul style="list-style-type: none"> 1. Students can understand Soil-environment interaction, Soil mineralogy and 2. Mechanisms of soil-water interaction 3. Students can learn ground water flow and predict contaminant transport phenomenon. 4. Can apply remediation techniques for contaminated site.
7	GTPE23	Critical State Soil Mechanics	2019	<ul style="list-style-type: none"> 1. Acquire fundamentals concept of Stresses and Strains and their states in soils. 2. Comprehend the critical state line and the Roscoe surface. 3. Gain knowledge on Cam-Clay model for analyzing the the plastic behaviour of soils before failure. 4. Familiarize with the Development of constitutive laws for geotechnical materials including linear or nonlinear elastic (hyperbolic), linear elastic perfectly plastic, and non-linear elastic-plastic models based on the Critical State Soil Mechanics theory.
8	GTCP01	Geotechnical Engineering Lab - 1	2019	<ul style="list-style-type: none"> 1. Determine all Index Properties for Cohesive and Cohsionless Soils 2. Determine Density Index for Cohesionless Soils.

				<p>3. Determine Compaction Characteristics for Cohesive Soils</p> <p>4. Determine Permeability Characteristics for Cohesive and Cohesionless Soils.</p>
9	GTCP02	Geotechnical Engineering Lab - 2	2019	<p>1. Determine Unconfined Compressive Stress for Cohesive Soils.</p> <p>2. Determine shear parameter for Cohesionless Soils.</p> <p>3. Determine Swelling Characteristics by different methods.</p>
10	PGPC41	Research Methodology and IPR	2019	<p>1. Understand research problem formulation.</p> <p>2. Analyze research related information</p> <p>3. Follow research ethics</p> <p>4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</p> <p>5. Understanding that when IPR would take such important place in growth of individuals</p> <p>& Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. Understand that IPR protection provides an incentive to inventors for further research work and</p>

				investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
11	GTPC0 3	Dynamics of soils and foundations	2019	<ol style="list-style-type: none"> 1. Students understands theory of vibration and resonance phenomenon, dynamic amplification 2. Students understand propagation of body waves and surface waves through soil. 3. Student exposed to different methods for estimation of dynamic soil properties required for design purpose. 4. Students apply theory of vibrations to design machine foundation based on dynamic soil properties and bearing capacity. 5. Students can predict dynamic bearing capacity and methods of vibration isolation.
12	GTPC0 4	Subsurface investigations and instrumentation	2019	<ol style="list-style-type: none"> 1. Students can plan subsurface investigation based on the requirement of civil engineering project and site condition. Can finalize depth and number of boreholes 2. Students can execute different subsurface exploration tests, collect Disturbed / undisturbed samples for laboratory tests and can suggest design parameters. 3. Student exposed to different methods for estimation of soil properties required for design purpose. 4. Students can develop instrumentation scheme for monitoring of critical sites
13	GTPE31	Offshore Geotechnical Engineering / Marine Geotechniques	2019	<ol style="list-style-type: none"> 1. Physical and Engineering properties of marine soils and problems specific to marine soil deposits. 2. Behavior of sands and clays under cyclic loading

				<p>3. Site investigation in marine environment including Geophysical methods.</p> <p>4. Assess the factors governing the choice of the most suitable type of foundation for a given marine Structure.</p> <p>5. Select the type of foundation for a given marine Structure.</p>
14	GTPE32	Computational Geomechanics	2019	<p>1. Solution of linear equations</p> <p>2. Finite difference form of ordinary and partial differential equations</p> <p>3. Difference between correlation and regression analysis.</p> <p>4. Apply finite difference technique to solve complex consolidation and seepage problems in Geotechnical Engineering.</p>
15	GTPE33	3. Engineering rock mechanics	2019	<p>1. Assess the Physical and Mechanical properties of rocks.</p> <p>2. Adopt direct & indirect methods of rock exploration.</p> <p>3. Conduct different laboratory tests on rocks and analyse the results for rock properties</p> <p>4. Stress Strain behavior under Compressive, tension and Shear</p> <p>5. Strength criteria functions applied to Rocks.</p>
16	GTPE41	Earth Retaining Structures	2019	<p>1. Develop an understanding of the fundamental concepts that governs the behaviour of</p>

				<p>Earth and Earth Retaining Structures.</p> <ol style="list-style-type: none"> 2. Analyze and Design Retaining Walls, 3. Analyze and Design Braced Cuts, 4. Analyze and Design Shafts, Tunnels and Underground Conduits.
17	GTPE42	Design of underground excavations	2019	<ol style="list-style-type: none"> 1. Students can plan exploration for various underground projects. 2. Students can understand the use of elastic and plastic analysis in the design of underground support system. 3. Students can classify rock masses and select suitable method for advising tunnels. 4. Design of various tunnel support system. 5. Students will have idea about the field tests generally conducted during and after construction of under structures.
18	GTPE43	Physical and Constitutive Modelling in Geomechanics	2019	<ol style="list-style-type: none"> 1. Stress strain models of elasticity of isotropic and anisotropic models. 2. Students can understand theory of plasticity and various yield criteria and flow rule. 3. Students can apply critical state concept to consolidation and triaxial soil behavior. 4. Students can understand the application aspects of elastic plastic models.

19	GTCP0 3	Sub soil exploration	2019	<ol style="list-style-type: none"> 1. Evaluate vertical and lateral extent of exploration; identify, select, and plan different stages of subsurface exploration for various civil engineering projects. 2. Discriminate, Classify and analyses different techniques of exploration to be adopted in rocks and soils. 3. Discriminate different types of soil samples, samplers and judge the appropriateness of a sample or sampler for practical cases accounting for the safety and economy. 4. Evaluate different in-situ methods of tests to determine engineering properties of soils and locate Ground water table required for safe and economic design of foundations. 5. Methods of planning, executing, implementing, interpreting, and reporting subsoil investigations based on geophysical methods
20	GTCP0 4	Numerical Analysis Lab	2019	<ol style="list-style-type: none"> 1. Develop and Analysis of laboratory tests results using Spread sheets 2. Develop and analysis of Spread sheets for stress distribution for different loading conditions. 3. Determine Bearing Capacity of given soil sample. 4. Able to determine settlements
21	GTPE51	Stability analysis of slopes	2019	<ol style="list-style-type: none"> 1. Identifying types and causes of slope failures. 2. Student will be able to check the stability of earthen dams 3. The safety measures to be undertaken to prevent the instability of slopes, earthen dams and embankments. 4. Understand maintenance and monitoring of slopes.

22	GTPE52	Foundations on weak rocks	2019	<ol style="list-style-type: none"> 1. Understand Rock mass classification and its Engineering properties. 2. Determine engineering properties of in-situ rocks and modes of failure associated. 3. Assess allowable Bearing pressure. 4. Design different types of foundations planned over rock mass.
23	GTPE53	Geotechnical earthquake engineering	2019	<ol style="list-style-type: none"> 1. Students will know the causes and quantification of earthquake. 2. Student will be exposed to the effect of earthquake and ground motion. 3. Student will be able to understand Ground response analysis and Liquefaction effects. 4. Student will be able to understand the seismic design of foundation
24	GTOE11	Business Analytics	2019	<ol style="list-style-type: none"> 1. Students will demonstrate knowledge of data analytics. 2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics. 3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. Students will demonstrate the ability to translate data

				into clear, actionable insights.
25	GTOE12	Industrial Safety	2019	<ol style="list-style-type: none"> 1. Students will demonstrate knowledge of data analytics. 2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics. 3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. Students will demonstrate the ability to translate data into clear, actionable insights.
26	GTOE13	Operations Research	2019	<ol style="list-style-type: none"> 1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables. 2. Students should able to apply the concept of non-linear programming 3. Students should able to carry out sensitivity analysis 4. Student should able to model the real world problem and simulate it.
27	GTOE14	Cost Management of Engineering Projects	2019	<ol style="list-style-type: none"> 1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables. 2. Students should able to apply the concept of non-linear programming 3. Students should able to carry out sensitivity analysis 4. Student should able to model the real world problem and simulate it.
28	GTOE15	Composite Materials	2019	<ol style="list-style-type: none"> 1. Students should able to apply the dynamic

				<p>programming to solve problems of discrete and Continuous variables.</p> <p>2. Students should be able to apply the concept of non-linear programming</p> <p>3. Students should be able to carry out sensitivity analysis</p> <p>Student should be able to model the real world problem and simulate it</p>
29	GTOE16	Energy Generation from Waste	2019	<p>1. Students should be able to apply the dynamic programming to solve problems of discrete and Continuous variables.</p> <p>2. Students should be able to apply the concept of non-linear programming</p> <p>3. Students should be able to carry out sensitivity analysis</p> <p>Student should be able to model the real world problem and simulate it.</p>

Computer Science and Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MABST101	Mathematics I	2019	<p>1. analyze differential equations and solve them</p> <p>2. apply differential equations to engineering problems.</p> <p>3. use transformation to convert one type into another type presumably easier to solve.</p> <p>4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients.</p> <p>5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform.</p>

				<p>6. expand functions as power series using Maclaurin's and Talor's series</p> <p>7. optimize the problems related to OR, Computer science, Probability and Statistics</p> <p>8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc using curve tracingmethodto find length, area, volume.</p> <p>9. use multiple integral in evaluating area and volume of any region bounded by the given curves.</p>
	PYBST102	Modern Physics	2019	<ul style="list-style-type: none"> • Apply Cauchy's Theorem and Cauchy's Integral Formula□ • Compute logarithms and inverse trigonometric functions and calculate Taylor and Laurent series□ • Use complex analysis techniques such as the residue theorem to evaluate real integrals□ <ul style="list-style-type: none"> • Apply appropriate algorithms to solve selected problems, both manually and by writing computer programs.□ • Compare different algorithms with respect to accuracy and efficiency of solution.□ • Conduct numerical integration and differentiation.□
	ECPCT 402	Digital Electronics and Logic Design	2019	<ol style="list-style-type: none"> 1. Design and analyze combinational logic circuits 2. Design and analyze synchronous sequential logic circuits 3. Design and implement complicated digital systems

				using Verilog 4. Design a VLSI circuit for an application
	MEPCT 403	Simulation and Modeling	2019	<ul style="list-style-type: none"> • describe the components of continuous and discrete systems and simulate the same.□ • model any system from different fields.□ • discuss the simulation methods and select the suitable technique on the problems.□ • implement the model on the computer and from the results, check for the validity of the model and correctness of the assumptions present in the model.□ • understand the limitations of their model and nuances in computer modeling of systems.□
	CSPCT 404	Design and Analysis of Algorithms	2019	<ul style="list-style-type: none"> • Develop systematically an algorithm for solving a problem • Analyze the time and space complexity of the given algorithm • Identify algorithm design methodology to solve problems. • Distinguish between P and NP classes of problems
	CSPCT 405	Computer Organization	2019	<ul style="list-style-type: none"> • Identify the basic structure and functional units of a digital computer. • Analyze the effect of addressing modes on the execution time of a program. • Design processing unit using the concepts of hardwired control or microprogrammed control. • Select appropriate interfacing standards for I/O devices. • Identify the roles of various functional units of a computer in instruction execution. • Understand memory hierarchy and its impact on computer cost/performance. • Understand the advantage of instruction level

				parallelism and pipelining for high performance processor design.
	CSPCT 406	Database Management Systems	2019	<ul style="list-style-type: none"> • Use relational algebra and relational calculus, to express database queries. • Use SQL to interact with database management systems. • Design appropriate database tables, using functional dependencies and normal forms. • Implement a disk-oriented database storage manager with heap table and indexes. • Understand, compare, and implement the major concurrency control algorithms. • Implement database recovery algorithms and verify their correctness. • Identify trade-offs among database systems techniques and contrast distributed/parallel alternatives for both on-line transaction processing and on-line analytical workloads.
	CSPCT 501	Operating Systems	2019	<ol style="list-style-type: none"> 1. Recognize how the applications interact with the operating system as the latter working as intermediary program between the machine and the application. 2. Understand how operating system manages resources such as processors, memory and I/O. 3. Demonstrate knowledge and understanding of how concurrency in OS is handled. 4. Understand the techniques used to implement the process manager 5. Implement various memory management and demand paging techniques. 6. Comprehend virtual memory abstractions in operating systems 7. Design and develop file system interface. 8. Understand various schemes available for achieving

				system protection and system security
	CSPCT 502	Formal Languages and Automata Theory	2019	<ul style="list-style-type: none"> • Write a formal notation for strings, languages and machines. • Design finite automata to accept a set of strings of a language. • Determine whether the given language is regular or not. • Design context free grammars to generate strings of context free language. • Determine equivalence of languages accepted by pushdown automata and languages generated by context free grammars • Distinguish between computability & non-computability and decidability & undecidability.
	CSPCT 503	Software Engineering	2019	<ul style="list-style-type: none"> • Define and develop a software project from requirement gathering to implementation. • Obtain knowledge about principles and practices of software engineering. • Focus on the fundamentals of modeling a software project. • Obtain knowledge about estimation and maintenance of software systems <ul style="list-style-type: none"> • Comprehend, assess, and calculate the cost of risk involved in a project management • Implement testing methods at each phase of SDLC
	MEBST 506	Basics of Mechanical Engineering	2019	<ul style="list-style-type: none"> • Apply basic concepts of mathematics to formulate an optimization problem□ • Analyse and appreciate variety of performance measures for various optimization problems□ • Select appropriate solution technologies and

				<p>strategies,□</p> <ul style="list-style-type: none"> • Interpret the solution of an optimization problem□ • Understand the effects of problem variation on the optimal solution.□
	CSPCP 507	Operating Systems Laboratory	2019	<ol style="list-style-type: none"> 1. Understand basics of thermodynamics and components of thermal plant 2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice. 3. Understand basics of heat transfer, refrigeration and internal combustion engines. 4. Understand mechanism of power transfer through belt, chain, rope and gear drives. 5. Understand functions and operations of machine tools including milling, grinding, and shaping machines.
	CSPCT 601	Principles of Programming Languages	2019	<ul style="list-style-type: none"> • Describe syntax and semantics of programming languages • Analyze the design issues involved in various constructs of programming languages • Explain data, data types, and basic statements of programming languages • Apply object-oriented, concurrency, and exception handling features of PLs. • Design and implement programs in Scheme, ML, and Prolog
	CSPCT 602	Computer Networks	2019	<ul style="list-style-type: none"> • Choose the transmission media depending on the requirements. • Explain the functions of different layer of the OSI Protocol • Analyze MAC layer protocols and LAN technologies • Implement routing and congestion control algorithms • Design new protocols for computer network. • Configure DNS, DDNS, TELNET, EMAIL,

				FTP, WWW, HTTP, SNMP, Bluetooth, Firewalls using open source software and tools.
	CSPCT 603	Language Processors	2019	<ul style="list-style-type: none"> • Design a compiler for a simple programming language • Understand phases in the design of compiler • Design top-down and bottom-up parsers • Develop syntax directed translation schemes • Comprehend and adapt to Lex and Yacc tools in compiler design
	CSPCT 604	Artificial intelligence	2019	<ul style="list-style-type: none"> • Demonstrate basic understanding of artificial intelligence and its fundamentals. • Identify a search algorithm for a problem and estimate its time and space complexities. • Possess the skill for representing knowledge using the appropriate technique for a given problem • Possess the ability to apply AI techniques to solve problems of game playing, expert systems, machine learning and robotics.
	CEEST 605	Basics of Civil Engineering	2019	<ul style="list-style-type: none"> • Find the suitability of various building materials at a particular location in the building construction. • Analyze the status of water quality standards for drinking and construction
	CSPCT 606	Cryptography	2019	<ul style="list-style-type: none"> • Understand the basic concepts of symmetric cryptosystem, public key cryptosystem and digital signature scheme • Reason about the security of cryptographic constructions • Break the cryptosystems that are not secure
	CSPET 701	Web and mobile technologies	2019	<ul style="list-style-type: none"> • Design and develop dynamic and interactive web sites.□ • Develop real world applications using client side and server side scripting languages□ • Design Android User Interface for mobile

				applications.□
	CSPET 702	Computer graphics	2019	<ul style="list-style-type: none"> • Understand the various computer graphics hardware and display technologies.□ • Implement various 2D and 3D objects transformation techniques.□ • Apply 2D and 3D viewing technologies into the real world applications□
	CSPEP 703	Soft computing	2019	<ul style="list-style-type: none"> • Comprehend the fuzzy logic and the concept of fuzziness involved in various systems.□ • Understand the role of soft computing techniques in solving real world applications□ • Build optimal classifiers using genetic algorithms□ • Implement fuzzy logic controller using MATLAB fuzzy logic toolbox□
	CSPEP 704	Cloud computing	2019	<ul style="list-style-type: none"> • Identify the architecture, service models and deployment models of Cloud.□ • Analyze authentication, confidentiality and privacy issues in Cloud computing environment.□ • Determine technological implications for selecting cloud computing platforms□ • Design and develop applications for Cloud environment
	CSPWP 705	Data mining	2019	<ul style="list-style-type: none"> • Comprehend the various architectures and its application with data mining□ • Design and develop data mining algorithms to analyze raw real world data□ • Apply preprocessing techniques for data cleansing□ • Analyze multi-dimensional modeling techniques and Classification & Clustering algorithms□
	CSINP 706	Software project management	2019	<ul style="list-style-type: none"> • Describe the importance of project management from the perspectives of improving software economics.□ • Describe software management process framework.□

	CSSEP 707	Big data analytics	2019	<ul style="list-style-type: none"> • Understand big data challenges in different domains viz. social media, transportation, finance, medicine and apply the concepts of big data analytics for the said domains.□ • Apply several newer algorithms for Clustering, Classifying and finding associations in Big Data□ • Design and develop Hadoop and Map Reduce Framework□ • Handle several Data Intensive tasks using the Map Reduce Paradigm□
	MEPCT 801	Cyber security	2019	<ul style="list-style-type: none"> • Effectively use cyber security and computer forensics software/tools□ • Measure the performance and troubleshoot cyber security systems.□ • Protect the network from both internal and external attacks□ • Provide new security solutions and and implement the same confidently.□
	COPCT 802	Image processing	2019	<ul style="list-style-type: none"> • Understand Image representation and modeling.□ • Design and apply image enhancement and restoration techniques□ • Develop image processing techniques for assisting digital forensics□

Computer Science and Engineering M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	CSCOT 01C	Data Structures and Algorithms	2019	1. Acquire knowledge of various Methods and Notations for comparing the performance of various Data Structures.

				<ul style="list-style-type: none"> 2. Acquire knowledge of development of linear data structures like stacks, Queues and their operations, Implementation using Arrays and Linked Lists. 3. Acquire knowledge of properties of Binary Search Trees and balanced binary search trees. 4. Acquire knowledge of Hashing, String Searching Algorithms and their implementation
	CSCOT 02C	Advanced topics in Database Management Systems	2019	<ul style="list-style-type: none"> 1. Acquire knowledge to Develop skills to design and analyze of logical and Physical databases 2. Acquire knowledge to Parallel and Distributed Databases. 3. Acquire knowledge to Data Warehousing and Decision Support. 4. Acquire knowledge to Information Retrieval and XML Data
	CSCOT 03C	Cryptography & Network Security	2019	<ul style="list-style-type: none"> 1. Acquire the knowledge of develop Traditional Symmetric-Key Ciphers 2. Acquire the knowledge of develop Modern Symmetric-Key Ciphers. 3. Acquire the knowledge of develop Encipherment Using Modern Symmetric-Key Ciphers. 4. Acquire the knowledge of develop Message Integrity, Random Oracle model, Message Authentication. Cryptographic Hash Functions. 5. Acquire the knowledge of develop Network Security
	CSCOT 07E	Machine Learning	2019	<ul style="list-style-type: none"> 1. Acquire knowledge to develop Machine Learning Applications. 2. Acquire knowledge to develop Multivariate Methods. 3. Acquire knowledge to develop Nonparametric Methods. 4. Acquire knowledge to develop Kernel Machines. 5. Acquire knowledge to Design and Analysis of Machine Learning Experiments

	CSCOT 08E	Research Methodology	2019	<ol style="list-style-type: none"> 1. Acquire knowledge to Develop Performance Evaluation of a Computer-based System. 2. Acquire knowledge to Develop Probability Distributions. 3. Acquire knowledge to Develop Statistical Inference. 4. Acquire knowledge to Develop Optimization Problems. 5. Acquire knowledge to Design and Analysis of simulation models
	CSCOT 09E	Internet of Things	2019	<ol style="list-style-type: none"> 1. Acquire knowledge to Develop Internet of Things. 2. Acquire knowledge to Develop IoT System Management with NETCONF-YANG. 3. Acquire knowledge to Develop IoT Physical Devices & Endpoints. 4. Acquire knowledge to Develop IoT Design: Home Automation. 5. Design and Analysis of Data Analytics for IoT
	CSCOTP 01	Core –I Laboratory	2019	<ol style="list-style-type: none"> 1. Acquire knowledge to develop Machine Learning Applications. 2. Acquire knowledge to develop Multivariate Methods. 3. Acquire knowledge to develop Nonparametric Methods. 4. Acquire knowledge to develop Kernel Machines. 5. Acquire knowledge to Design and Analysis of Machine Learning Experiments 6. Acquire knowledge to Develop Probability Distributions. 7. Acquire knowledge to Develop Statistical Inference. 8. Acquire knowledge to Develop Optimization Problems.

				<ul style="list-style-type: none"> 9. Acquire knowledge to Design and Analysis of simulation models 10. Acquire knowledge to Develop IoT Physical Devices & Endpoints. 11. Acquire knowledge to Develop IoT Design: Home Automation. 12. Design and Analysis of Data Analytics for IoT
	CSCOP 02	Elective-I Laboratory	2019	<ul style="list-style-type: none"> 1. Develop Machine Learning Applications. 2. Develop Multivariate Methods. 3. Develop Nonparametric Methods. 4. Develop Kernel Machines. 5. Develop Design and Analysis of Machine Learning Experiments. 6. Develop Probability Distributions. 7. Develop Statistical Inference. 8. Develop Optimization Problems. 9. Design and Analysis of simulation models 10. Develop IoT Physical Devices & Endpoints. 11. Develop IoT Design: Home Automation. 12. Design and Analysis of Data Analytics for IoT.
	CSCOT 04C	Advances in Artificial Intelligence	2019	<ul style="list-style-type: none"> 1. Acquire knowledge of State-Space Search. 2. Acquire knowledge of Game playing algorithms. 3. Acquire knowledge of Genetic Algorithms and Neural networks. 4. Acquire knowledge of Robotic Control Systems. 5. Acquire knowledge of Deep learning – Convolution networks
	CSCOT 05C	Topics in Operating Systems	2019	<ul style="list-style-type: none"> 1. Acquire knowledge of CPU scheduling algorithms. 2. Acquire knowledge of , File system implementation. 3. Acquire knowledge of Distributed Systems . 4. Acquire knowledge of internals of - Linux Operating System. 5. Acquire knowledge of Internals of - MAC Operating

				System.
	CSCOT 06C	Distributed and Cloud Computing	2019	<ol style="list-style-type: none"> 1. Acquire knowledge of Distributed System Models. 2. Acquire knowledge of Virtual Machines and Virtualization of Clusters. 3. Acquire knowledge of Service-Oriented Architectures. 4. Acquire knowledge of Cloud Programming. 5. Acquire knowledge of Peer-to-Peer Computing Systems.
	CSCOT 10E	Artificial Neural Networks (Open Elective, other Branches)	2019	<ol style="list-style-type: none"> 1. Acquire knowledge of Pattern recognition methods. 2. Acquire knowledge of Functional Units of ANNs for Pattern Recognition Tasks. 3. Acquire knowledge of Feed-back Neural Networks. 4. Acquire knowledge of Competitive Learning Neural Networks. 5. Acquire knowledge of Applications of ANNs.
	CSCOT E11	Big Data Analytics	2019	<ol style="list-style-type: none"> 1. Acquire knowledge of Statistical Limits on Data Mining. 2. Acquire knowledge of Applications of Near-Neighbor Search. 3. Acquire knowledge of A-Priori Algorithm. 4. Acquire knowledge of On-Line Algorithms. 5. Acquire knowledge of Mining Social-Network Graphs.
	CSCOT 12E	Cyber Security	2019	<p>Acquire knowledge of Building a Secure Organization, Preventing System Intrusions.</p> <p>Acquire knowledge of Wireless Network Security.</p> <p>Acquire knowledge of Intrusion Prevention and Detection Systems.</p> <p>Acquire knowledge of Virtual Private Networks.</p>

				Acquire knowledge of Biometrics.
	CSCOP 03	Core-II Laboratory	2019	<ol style="list-style-type: none"> 1. Acquire knowledge of State-Space Search. 2. Acquire knowledge of Game playing algorithms. 3. Acquire knowledge of Genetic Algorithms and Neural networks. 4. Acquire knowledge of Deep learning –Convolution networks 5. Acquire knowledge of CPU scheduling algorithms. 6. Acquire knowledge of , File system implementation. 7. Acquire knowledge of Distributed Systems . 8. Acquire knowledge of internals of - Linux Operating System. 9. Acquire knowledge of Internals of - MAC Operating System. 10. Acquire knowledge of Distributed System Models. 11. Acquire knowledge of Cloud Programming. 12. Acquire knowledge of Peer-to-Peer Computing Systems.
	CSCOP 04	Elective –II Laboratory	2019	<ol style="list-style-type: none"> 1. Acquire knowledge of Statistical Limits on Data Mining. 2. Acquire knowledge of Applications of Near-Neighbor Search. 3. Acquire knowledge of A-Priori Algorithm. 4. Acquire knowledge of On-Line Algorithms. 5. Acquire knowledge of Mining Social-Network Graphs 6. Acquire knowledge of Building a Secure Organization, Preventing System Intrusions. 7. Acquire knowledge of Wireless Network Security. 8. Acquire knowledge of Intrusion Prevention and Detection Systems. 9. Acquire knowledge of Virtual Private Networks. 10. Acquire knowledge of Biometrics.

				Acquire knowledge of Experiments from Elective From other branch
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Electronics and communication engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	MABST 101	Mathematics-I	2019	<ol style="list-style-type: none"> 1. analyzed differential equations and solve them 2. apply differential equations to engineering problems. 3. use transformation to convert one type into another type presumably easier to solve. 4. use shift theorem to compute the Laplace transform, inverse Laplace transform and the solution of second order, linear equations with constant coefficients. 5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform. 6. expand functions as power series using Maclaurin's and Taylor's series 7. optimize the problems related to OR, Computer science, Probability and Statistics
	PYBST 102	Modern Physics	2019	<ol style="list-style-type: none"> 1. develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses 2. understand the quantum mechanics and ultimately the quantum behavior of charged particles when they

				<p>are in motion.</p> <p>3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems</p> <p>4. apply knowledge of band theory in the area of electronics and understanding the basic electron transportation phenomenon in micro devices.</p> <p>5. understand the principles in electrostatics and electromagnetics and magnetic properties of materials.</p> <p>6. understand size dependent properties of nanodimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices.</p> <p>7. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.</p> <p>8. learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.</p> <p>9. provide multidisciplinary experiences throughout the curriculum.</p>
	CSEST 103	Programming for Problem Solving	2019	
	ECEST 104	Electronic Devices	2019	<p>1. understand the principles of semiconductor physics of the intrinsic, p and n type materials.</p> <p>2. understand the characteristics of the diode and some special function diodes and their application in electronic circuits.</p>

				<ol style="list-style-type: none"> 3. use mathematics to analyze electronic devices typical of those in switching and rectifier circuits. 4. understand and utilize the mathematical models of semiconductor junctions and transistors for circuits and systems. 5. understand the characteristics of the Transistors and opto-electronic devices and their application in electronic circuits. 6. apply thyristors in power switching and control circuits.
	MEESP 105	Workshop/Manufacturing Practices	2019	Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.
	CSESP 106	Programming for Problem Solving Lab	2019	<ol style="list-style-type: none"> 1. formulate simple algorithms for arithmetic and logical problems. 2. translate the algorithms to programs (in C language). 3. test and execute the programs and correct syntax and logical errors. 4. implement conditional branching, iteration and recursion. 5. decompose a problem into functions and synthesize a complete program using divide and conquer approach. 6. use arrays, pointers and structures to formulate algorithms and programs. 7. apply programming to solve matrix addition and multiplication problems and searching and sorting problems. <p>and to apply programming to solve simple numerical method pro</p>

				blems, namely root finding of function, differentiation of function and simple integration
	CEACT 107	Environmental Science	2019	<p>1. acquire knowledge in</p> <ul style="list-style-type: none"> • diverse components of environment and natural resources • ecosystem and biodiversity & its conservation methods • population growth and human health • green technology <p>2. identify and resolve the issues related to sources of different types of pollutions</p> <p>3. provide solutions to individuals, industries and government for sustainable development of natural resources</p> <p>apply environmental ethics in protection of diversified ecosystems.</p>
	MABST 201	Mathematics–II	2019	<p>1. use rank of matrices to decide whether the system of linear equations is consistent or not</p> <p>2. use Cayley-Hamilton theorem to find inverses or powers of matrices.</p> <p>3. use Eigen values and vector to reduce Quadratic form to normal form.</p> <p>4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. use Green's theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. use Stokes' theorem to give a physical interpretation of the curl of a vector field</p> <p>7. use the divergence theorem to give a physical interpretation of the divergence of a vector field</p>
	CYBST	Engineering Chemistry	2019	1. analyse microscopic

	202			<p>chemistry in terms of atomic and molecular orbitals and intermolecular forces.</p> <p>2. rationalise bulk properties and processes using thermodynamic considerations.</p> <p>3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques</p> <p>4. rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.</p> <p>5. list major chemical reactions that are used in the synthesis of molecules.</p>
	HSENT 203	English	2019	<p>1. learn the elements of grammar and composition of English Language.</p> <p>2. Learn literary texts such as Short stories and prose passages</p>
	EEEST 204	Basic Electrical Engineering	2019	<p>1. understand and analyze basic electric and magnetic circuits.</p> <p>2. study the working principles of electrical machines and power converters.</p> <p>3. introduce the components of low-voltage electrical installations.</p>
	MEEEST 205	Engineering Graphics & Design	2019	<p>1. make a distinction between first angle projection and third angle projection of drawing.</p> <p>2. draw hyperbola, parabola, involutes and Cycloidal curves.</p> <p>3. draw sections of solids including cylinders, cones, prisms and pyramids.</p> <p>4. draw projections of lines, planes, solids and sections of solids.</p> <p>5. draw orthographic projections of lines, planes, and solids.</p>
	HSENP	English Communications Lab	2019	The student will acquire basic proficiency in English including

	206			reading and listening comprehension, writing and speaking skills.
	MABST30 1	Mathematics-III	2019	<ol style="list-style-type: none"> 1. Solve field problems in Vector Analysis and Numerical Methods 2. Solve field problems in engineering involving PDEs. 3. They can also formulate and solve problems involving random variables and apply statistical methods for analysing experimental data. 4. They can formulate and solve problems Test of significance.
	EEPCT30 2	Network Theory	2019	<ol style="list-style-type: none"> 1. Understand basics electrical circuits with nodal and mesh analysis. 2. Appreciate electrical network theorems. 3. Apply Laplace Transform for steady state and transient analysis. 4. Determine different network functions. 5. Appreciate the frequency domain techniques.
	ECPCT30 3	Electromagnetic Waves	2019	<ol style="list-style-type: none"> 1. Understand characteristics and wave propagation on high frequency transmission lines. 2. Carry out impedance transformation on transmission lines. 3. Use sections of transmission line sections for realizing circuit elements 4. Characterize uniform plane wave. 5. Calculate reflection and transmission of waves at media interface. 6. Analyze wave propagation on metallic waveguides in modal form. 7. Understand principle of radiation and radiation characteristics of an antenna

	HSMCT30 5	Economics	2019	<ol style="list-style-type: none"> 1. Design and analyze combinational logic circuits. 2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder. 3. Design & analyze synchronous sequential logic circuits. 4. Use HDL & appropriate EDA tools for digital logic design and simulation.
	ECPCP30 7	Electronic Devices Lab	2019	<ol style="list-style-type: none"> 1. Get an exposure to common electrical components and their ratings. 2. Make electrical connections by wires of appropriate ratings. 3. Understand the usage of common electrical measuring instruments. 4. Understand the basic characteristics of transformers and electrical machines. 5. Get an exposure to the working of power electronic converters.
	ECPCP30 8	Digital System Design Lab	2019	<ol style="list-style-type: none"> 1. To gain introduction to managerial economics and demand analysis 2. To estimate Cost Analysis Production and Supply Analysis 3. To understand Price and Output Decisions Under Different Market Structures 4. To be able to analyze Profit Management
	EEESP 309	Basic Electrical Engineering Lab	2019	<ol style="list-style-type: none"> 1. To gain knowledge in to managerial Accounting, and Financial Statement Analyses 2. To be able to know the methods of Depreciation 3. To gain Knowledge in Capital Budgeting 4. To get expertise in Marginal Costing
	HSACT31 0	Constitution of India	2019	<ol style="list-style-type: none"> 1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective. 2. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and

				entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism. 3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.
	ECPCT40 1	Analog Circuits	2019	1. Understand the characteristics of diodes and transistors. 2. Design and analyze various rectifier and amplifier circuits. 3. Design sinusoidal and non-sinusoidal oscillators. 4. Understand the functioning of OP-AMP and design OP-AMP based circuits. 5. Design ADC and DAC
	ECPCT40 2	Signals and Systems	2019	
	ECPCT40 3	Probability Theory and Stochastic Processes	2019	1. Analyze and compare different analog modulation schemes for their efficiency and bandwidth 2. Analyze the behavior of a communication system in presence of noise. 3. Investigate pulsed modulation / band pass modulation system and analyze their system performance. 4. Analyze different digital modulation schemes and can compute the bit error performance.
	CSPCT40 5	Computer Organization and Architecture	2019	1. Analyze different types of signals 2. Understand the concepts of continuous time and discrete time systems. 3. Analyse systems in complex frequency domain. 4. Investigate whether the system is stable or not. 5. Understand sampling theorem and its implications.
	HSMCT40	Management Science	2019	1. Work more creatively, work in groups

	6			<p>2. Presenting ideas more effectively and efficiently in formal and informal ways.</p> <p>3. Development of fundamental rethinking and radical redesign in the organizations.</p> <p>4. Applying the ideas of the course to identifying and solving real world problems.</p> <p>5. Development of Group Dynamic Skills</p>
	EEPCT50 1	Linear Control Systems	2019	<p>Pharacterize a system and find its study state behavior.</p> <p>Investigate stability of a system its assessment for linear-time invariant systems using different tests.</p> <p>Design various simple feedback controllers.</p> <p>Understand the modeling of linear-time-invariant systems using transfer function and state-space representations.</p> <p>Solve liner, non-liner and optimal control problems.</p>
	ECPCT50 2	IC Applications	2019	<p>1: Understand the operation of analog electronic circuit systems and their components.</p> <p>2:demonstrate the use of analog circuit analysis techniques to analyze the operation and behavior of various analog integrated circuits.</p> <p>3: design differential amplifier using operational amplifier</p> <p>4: analyze stability of operational design differential amplifier using operational amplifier amplifiers</p> <p>5: Apply frequency compensation techniques for amplifiers</p> <p>6: design the different waveform generators using operational amplifiers.</p> <p>7: design linear applications circuits such as summer, integrator, and differentiator etc using op-amplifiers.</p> <p>8: design circuits such as log, comparator and multiplier etc using operational amplifiers</p>

	ECPCT50 4	Digital Signal Processing	2019	<ol style="list-style-type: none"> 1. Do assembly language programming. 2. Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc. 3. Develop systems using different microcontrollers. 4. Understand RSIC processors and design ARM microcontroller based systems
	ECPET505	Electronic Measurements	2019	<ol style="list-style-type: none"> 1: demonstrate the importance of various errors in the measurement process. 2: design of various devices like DC Ammeter and DC voltmeters using PMMC, ohmmeters. 3: demonstrate internal structure, working and design of various electronic devices like true RMS responding voltmeters, AC voltmeters. 4: demonstrate internal structure, working and design of various subsystems in CRO. 5: design electrostatic deflection systems. 6: understand the working principles of special purpose oscilloscopes. 7: design different electronic devices like Multimeters and Q-meters, etc. 8: design DC and AC bridges. 9: understand audio & radio frequency wave analyzers and spectrum analyzers. 10: understand the working of different Digital voltmeters. 11: understand the working of different digital instruments like universal counter, tachometers etc. 12:select a transducer for measurement of various physical parameters like displacement, pressure, temperature, strain etc.
	ECPCP51 0	Digital Signal Processing Lab	2019	<ol style="list-style-type: none"> 1. Represent signals mathematically in continuous and discrete time and frequency domain. 2. Get the response of an LSI system to different

				signals. 3. Design of different types of digital filters for various applications.
	ECPCT60 1	Computer Networks	2019	1. Understand the concepts of networking thoroughly. 2. Design a network for a particular application. 3. Analyze the performance of the network.
	ECPCP60 8	Electronic Measurements Lab	2019	Design and validate DC and AC bridges Analyze the dynamic response and the calibration of few instruments Learn about various measurement devices, their characteristics, their operation and their limitations Understand statistical data analysis Understand computerized data acquisition.
	ECPXP60 9	Electronic Design Workshop / Mini Project	2019	Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis. Design, implement and test the prototype/algorithm in order to solve the conceived problem. Write comprehensive report on mini project work.

Electronics and communication engineering M.Tech (Communication Systems)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	CSPC 01	Advanced Digital Signal Processing (Common to Signal Processing SPPC01)	2019	To understand theory of different filters and algorithms To understand theory of multirate DSP, solve numerical problems and write algorithms To understand theory of prediction and solution of normal equations To know applications of DSP at block level
	CSPC 02	Wireless and Mobile Communication	2019	Design appropriate mobile communication systems

				<p>Apply frequency-reuse concept in mobile communications, and to analyze its effects on interference, system capacity, handoff techniques</p> <p>Distinguish various multiple-access techniques for mobile communications e.g. FDMA, TDMA, CDMA, and their advantages and disadvantages.</p> <p>Analyze path loss and interference for wireless telephony and their influences on a mobile-communication system's performance.</p> <p>Analyze and design CDMA system functioning with knowledge of forward and reverse channel details, advantages and disadvantages of using the technology</p> <p>Understanding upcoming technologies like 3G, 4G etc.</p>
	CSPE 11	DSP Architecture(Common to Signal Processing SPPE11)	2019	<p>Identify and formalize architectural level characterization of P-DSP hardware</p> <p>Ability to design, programming (assembly and C), and testing code using Code Composer Studio environment</p> <p>Deployment of DSP hardware for Control, Audio and Video Signal processing applications</p> <p>Understanding of major areas and challenges in DSP based embedded systems</p>
	CSPE 12	Optical Networks	2019	<p>Contribute in the areas of optical network and WDM network design</p> <p>Implement simple optical network and understand further technology developments for future enhanced network.</p>
	CSPE 13	Statistical Information Processing	2019	<p>Characterize and apply probabilistic techniques in modern decision systems, such as information systems, receivers, filtering and statistical operations</p>

				<p>Demonstrate mathematical modelling and problem solving using such models</p> <p>Comparatively evolve key results developed in this course for applications to signal processing, communications systems.</p> <p>Develop frameworks based in probabilistic and stochastic themes for modelling and analysis of various systems involving functionalities in decision making, statistical inference, estimation and detection.</p>
	CSPE 21	Cognitive Radio	2019	<p>Understand the fundamental concepts of cognitive radio networks.</p> <p>Develop the cognitive radio, as well as techniques for spectrum holes detection that cognitive radio takes advantages in order to exploit it.</p> <p>Understand technologies to allow an efficient use of TVWS for radio communications based on two spectrum sharing business models/policies</p>
	CSPE 22	Voice and Data Networks (Common to Signal Processing SPPE22)	2019	<p>Protocol, algorithms, trade-offs rationale</p> <p>Routing, transport, DNS resolutions</p> <p>Network extensions and next generation architectures.</p>
	CSPE 23	Wireless sensor Networks	2019	<p>Design wireless sensor network system for different applications under consideration</p> <p>Understand the hardware details of different types of sensors and select right type of sensor for various applications.</p> <p>Understand radio standards and communication protocols to be used for wireless sensor network based systems and application.</p> <p>Use operating systems and programming languages for wireless sensor nodes, performance of wireless</p>

				<p>sensor networks systems and platforms</p> <p>Handle special issues related to sensors like energy conservation and security challenges</p>
	CSCP 01	Advanced Digital Signal Processing Lab (Common to Signal Processing SPCP01)	2019	<p>Design different digital filters in software</p> <p>Apply various transforms in time and frequency</p> <p>Perform decimation and interpolation</p>
	CSCP 02	Wireless and Mobile Communication Lab	2019	<p>Understanding Cellular concepts, GSM and CDMA networks</p> <p>To study GSM handset by experimentation and fault insertion techniques</p> <p>Understating of 3G communication system by means of various AT commands usage in GSM</p> <p>Understanding CDMA concept using DSSS kit</p> <p>To learn, understand and develop concepts of Software Radio in real time environment</p>
	PGMC 01	Research Methodology and IPR	2019	<ol style="list-style-type: none"> 1. understand research problem formulation. 2. analyze research related information 3. follow research ethics 4. understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5. understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. 6. understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new

				and better products, and in turn brings about, economic growth and social benefits.
	PGPA11	English and Research Paper Writing	2019	
	PGPA12	Disaster Management	2019	
	PGPA13	Sanskrit for Technical Knowledge	2019	<ol style="list-style-type: none"> 1. Understanding basic Sanskrit language 2. Ancient Sanskrit literature about science & technology can be understood 3. Being a logical language will help to develop logic in students
	PGPA14	Value Education	2019	<ol style="list-style-type: none"> 1. Knowledge of self-development 2. Learn the importance of Human values 3. Developing the overall personality
	CSPC 03	Antennas and Radiating Systems	2019	<ol style="list-style-type: none"> 1. Compute the far field distance, radiation pattern and gain of an antenna for given current distribution 2. Estimate the input impedance, efficiency and ease of match for antennas 3. Compute the array factor for an array of identical antennas. 4. Design antennas and antenna arrays for various desired radiation pattern characteristics.
	CSPC 04	Advanced Communication Networks	2019	<p>Understand advanced concepts in Communication Networking</p> <p>Design and develop protocols for Communication Networks.</p> <p>Understand the mechanisms in Quality of Service in networking.</p> <p>Optimise the Network Design</p>
	CSPE 31	Satellite Communication	2019	<ul style="list-style-type: none"> • Visualize the architecture of satellite systems as a means of high speed, high range communication system. • State various aspects related to satellite systems such as orbital equations, sub- systems in a satellite, link

				<p>budget, modulation and multiple access schemes.</p> <ul style="list-style-type: none"> • Solve numerical problems related to orbital motion and design of link budget for the given parameters and conditions.
	CSPE 32	IOT and Applications (Common to Signal Processing SPPE32)	2019	<p>Understand the concept of IOT and M2M</p> <p>Study IOT architecture and applications in various fields</p> <p>Study the security and privacy issues in IOT.</p>
	CSPE 33	RF and Microwave Circuit Design	2019	<p>Understand the behavior of RF passive components and model active components.</p> <p>Perform transmission line analysis</p> <p>Demonstrate use of Smith Chart for high frequency circuit design.</p> <p>Justify the choice/selection of components from the design aspects.</p> <p>Contribute in the areas of RF circuit design.</p>
	CSPE 41	Markov chain and Queuing System	2019	<ul style="list-style-type: none"> • Understand Markov Chains and regenerative processes used in modelling a wide variety of systems and phenomena • Model a system as queuing system with some aspect of the queue governed by a random process. • Understand telecommunication systems modelling using Markov chains with special emphasis on developing queuing models.
	CSPE 42	Pattern recognition and Machine Learning (Common to Signal Processing SPPC03)	2019	<ol style="list-style-type: none"> 1 Study the parametric and linear models for classification 2 Design neural network and SVM for classification 3 Develop machine independent and unsupervised learning techniques.
	CSPE 43	Programmable networks- SDN,NFV	2019	Understand advanced concepts in Programmable

				<p>Networks.</p> <p>Understand Software Defined Networking, an emerging Internet architectural framework.</p> <p>Implement the main concepts, architectures, algorithms, protocols and applications in SDN and NFV.</p>
	CSCP 03	Antennas and Radiating Systems Lab	2019	<p>Determine specifications, design, construct and test antenna.</p> <p>Explore and use tools for designing, analyzing and testing antennas. These tools include Antenna design and analysis software, network analyzers, spectrum analyzers, and antenna pattern measurement techniques.</p>
	CSCP 04	Advanced Communication Networks Lab	2019	<p>Identify the different types of network devices and their functions within a network.</p> <p>Understand and build the skills of sub-netting and routing mechanisms.</p> <p>Understand basic protocols of computer networks, and how they can be used to assist in network design and implementation.</p>
	PGPA21	Constitution of India	2019	<ol style="list-style-type: none"> 1. the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. the passage of the Hindu Code Bill of 1956
	PGPA22	Pedagogy Studies	2019	<ol style="list-style-type: none"> 1. What pedagogical practices are being used by

				<p>teachers in formal and informal classrooms in developing countries?</p> <p>2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</p> <p>3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</p>
	PGPA23	Stress Management by Yoga	2019	<p>1. Develop healthy mind in a healthy body thus improving social health also</p> <p>2. Improve efficiency</p>
	PGPA24	Personality Development through Life Enlightenment Skills	2019	<p>1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life</p> <p>2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity</p> <p>3. Study of Neetishatakam will help in developing versatile personality of students</p>
	CSMP 01	Mini Project with seminar	2019	<p>Understand of contemporary / emerging technology for various processes and systems</p> <p>Share knowledge effectively in oral and written form and formulate documents.</p>
	CSPE 51	Remote Sensing (Common to Signal Processing SPPE51)	2019	<p>Understand basic concepts, principles and applications of remote sensing, particularly the geometric and radiometric principles</p> <p>Provide examples of applications of principles to a variety of topics in remote sensing, particularly related to data collection, radiation, resolution, and sampling.</p>
	CSPE 52	High Performance Networks	2019	<p>Apply knowledge of mathematics, probability, and statistics to model and analyze some networking protocols.</p> <p>Design, implement, and analyze computer networks.</p>

				Identify, formulate, and solve network engineering problems Show knowledge of contemporary issues in high performance computer networks. Use techniques, skills, and modern networking tools necessary for engineering practice
	CSPE 53	MIMO Systems	2019	Understand channel modelling and propagation, MIMO Capacity, space-time coding MIMO receivers, MIMO for multi-carrier systems (e.g. MIMO-OFDM), multi-user communications, multi-user MIMO. Understand cooperative and coordinated multi-cell MIMO, introduction to MIMO in 4G (LTE, LTE-Advanced, WiMAX). Perform Mathematical modelling and analysis of MIMO systems.
	PGOE 11	Business Analytics	2019	1. knowledge of data analytics. 2. the ability of think critically in making decisions based on data and deep analytics. 3. the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. the ability to translate data into clear, actionable insights.
	PGOE 13	Operation Research	2019	1. apply the dynamic programming to solve problems of discreet and continuous variables. 2. apply the concept of non-linear programming 3. carry out sensitivity analysis 4. model the real world problem and simulate it.
	PGOE 14	Cost Management of Engineering Projects	2019	
	PGOE 15	Composite Materials	2019	
	PGOE 16	Waste to Energy	2019	

	CSPD 01	Dissertation Phase-I	2019	<ul style="list-style-type: none"> • Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem. • Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design. • Ability to present the findings of their technical solution in a written report. • Presenting the work in International/ National conference or reputed journals.
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Electronics and communication engineering M.Tech (Signal Processing)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	SPPC 01	Advanced Digital Signal Processing	2019	To understand theory of different filters and algorithms To understand theory of multirate DSP, solve numerical problems and write algorithms To understand theory of prediction and solution of normal equations To know applications of DSP at block level
	SPPC 02	Digital Image Video Processing	2019	<ul style="list-style-type: none"> • Learn different techniques for image enhancement, video and image recovery • Understand techniques for image and video segmentation • Study techniques for image and video compression and objectrecognition
	SPPE 11	DSP Architecture	2019	Identify and formalize architectural level

				<p>characterization of P-DSP hardware</p> <p>Ability to design, programming (assembly and C), and testing code using Code Composer Studio environment</p> <p>Deployment of DSP hardware for Control, Audio and Video Signal processing applications</p> <p>Understanding of major areas and challenges in DSP based embedded systems</p>
	SPPE 12	Computer Vision	2019	<p>Study the image formation models and feature extraction for computer vision</p> <p>Identify the segmentation and motion detection and estimation techniques</p> <p>Develop small applications and detect the objects in various applications</p>
	SPPE 13	Artificial Intelligence	2019	
	SPPE 21	Joint time frequency analysis and multiresolution analysis(JTFA and MRA)	2019	<ul style="list-style-type: none"> • Introduction to Transforms in signal processing • To understand Time -Frequency Analysis & Multiresolution • Analysis Study of Wavelets and its Applications
	SPPE 22	Voice and Data Networks	2019	<p>Protocol, algorithms, trade-offs rationale</p> <p>Routing, transport, DNS resolutions</p> <p>Network extensions and next generation architectures.</p>
	SPPE 23	Audio Video Coding & Compression	2019	<ul style="list-style-type: none"> • Familiarity to lossy and lossless compression systems. • Study of Video coding techniques and standards. • Understand audio coding and multimedia synchronization techniques.
	SPCP 01	Advanced Digital Signal Processing Lab	2019	<p>Design different digital filters in software</p> <p>Apply various transforms in time and frequency</p> <p>Perform decimation and interpolation</p>
	SPCP 02	Digital Image Video Processing Lab	2019	<p>Perform image and video enhancement</p> <p>Perform image and video segmentation</p>

				Detect an object in an image/video
	PGMC 01	Research Methodology and IPR	2019	<ol style="list-style-type: none"> 1. understand research problem formulation. 2. analyze research related information 3. follow research ethics 4. understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5. understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. 6. understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
	PGPA11	English and Research Paper Writing	2019	<ol style="list-style-type: none"> 1. Understand that how to improve your writing skills and level of readability 2. Learn about what to write in each section 3. Understand the skills needed when writing a Title <p>Ensure the good quality of paper at very first-time submission</p>
	PGPA12	Disaster Management	2019	<ol style="list-style-type: none"> 1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. 2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. 3. Develop an understanding of standards of humanitarian response and practical relevance in

				specific types of disasters and conflict situations. 4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in
	PGPA13	Sanskrit for Technical Knowledge	2019	1. Understanding basic Sanskrit language 2. Ancient Sanskrit literature about science & technology can be understood 3. Being a logical language will help to develop logic in students
	PGPA14	Value Education	2019	1. Knowledge of self-development 2. Learn the importance of Human values 3. Developing the overall personality
	SPPC 03	Pattern Recognition and Machine Learning	2019	Study the parametric and linear models for classification Design neural network and SVM for classification Develop machine independent and unsupervised learning techniques.
	SPPC 04	Detection and Estimation Theory	2019	<ul style="list-style-type: none"> • Understand the mathematical background of signal detection and estimation • Use classical and Bayesian approaches to formulate and solve problems for signal detection and parameter estimation from noisy signals. • Derive and apply filtering methods for parameter estimation.
	SPPE 31	Advanced Computer Architecture	2019	<ul style="list-style-type: none"> • Understand parallelism and pipelining concepts, the design aspects and challenges. • Evaluate the issues in vector and array processors. • Study and analyze the high performance scalable multithreaded and multiprocessor systems.
	SPPE 32	IOT and Applications	2019	Understand the concept of IOT and M2M Study IOT architecture and applications in various fields Study the security and privacy issues in IOT.

	SPPE 33	Digital Design and Verification	2019	<ul style="list-style-type: none"> • Familiarity of Front end design and verification techniques and create reusable test environments. • Verify increasingly complex designs more efficiently and effectively. • Use EDA tools like Cadence, Mentor Graphics.
	SPPE 41	Multispectral Signal Analysis	2019	<ul style="list-style-type: none"> • Select appropriate hyperspectral data for a particular application. • Understand basic concepts of data acquisition and image processing tasks required for multi and hyperspectral data analysis • Learn techniques for classification and analysis of multi and hyperspectral data.
	SPPE 42	Audio Processing	2019	<ul style="list-style-type: none"> • Understand different characteristics of Speech. • Identify and analyze different speech analysis system. • Write algorithms for Recognition of speech.
	SPPE 43	Biomedical Signal Processing	2019	<ul style="list-style-type: none"> • Understand different types of biomedical signal. • Identify and analyze different biomedical signals • Find applications related to biomedical signal processing
	SPCP 03	Pattern Recognition and Machine Learning Lab	2019	<ul style="list-style-type: none"> • Perform image and video enhancement • Perform image and video segmentation • Detect an object in an image/video
	SPCP 04	Detection and Estimation Theory Lab	2019	<ul style="list-style-type: none"> • Simulate signals and noise • Detect signals in the presence of noise • Compare various estimation techniques
	PGPA21	Constitution of India	2019	<ol style="list-style-type: none"> 1. the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. the circumstances surrounding the foundation of the

				<p>Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</p> <p>4. the passage of the Hindu Code Bill of 1956.</p>
	PGPA22	Pedagogy Studies	2019	<p>1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</p> <p>2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</p> <p>3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</p>
	PGPA23	Stress Management by Yoga	2019	<p>1. Develop healthy mind in a healthy body thus improving social health also</p> <p>2. Improve efficiency</p>
	PGPA24	Personality Development through Life Enlightenment Skills	2019	<p>1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life</p> <p>2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity</p> <p>3. Study of Neetishatakam will help in developing versatile personality of students</p>
	SPMP 01	Mini Project with seminar	2019	<ul style="list-style-type: none"> • Understand of contemporary / emerging technology for various processes and systems. • Share knowledge effectively in oral and written form and formulate documents.
	SPPE 51	Remote Sensing	2019	<p>Understand basic concepts, principles and applications of remote sensing, particularly the geometric and radiometric principles</p> <p>Provide examples of applications of principles to a variety of topics in remote sensing, particularly related</p>

				to data collection, radiation, resolution, and sampling.
	SPPE 52	Optimization Techniques	2019	<ul style="list-style-type: none"> • Understand importance of optimization • Apply basic concepts of mathematics to formulate an optimization problem • Analyze and appreciate variety of performance measures for various optimization problems
	SPPE 53	Modelling and Simulation Techniques	2019	<ul style="list-style-type: none"> • Identify and model discrete systems (deterministic and random) • Identify and model discrete signals (deterministic and random) • Understand modelling and simulation techniques to characterize systems/processes.
	PGOE 11	Business Analytics	2019	<ol style="list-style-type: none"> 1. knowledge of data analytics. 2. the ability of think critically in making decisions based on data and deep analytics. 3. the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. the ability to translate data into clear, actionable insights.
	PGOE 13	Operation Research	2019	<ol style="list-style-type: none"> 1. apply the dynamic programming to solve problems of discreet and continuous variables. 2. apply the concept of non-linear programming 3. carry out sensitivity analysis 4. model the real world problem and simulate it.
	SPPD 01	Dissertation Phase-I	2019	<ul style="list-style-type: none"> • Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem.

				<ul style="list-style-type: none"> • Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design. • Ability to present the findings of their technical solution in a written report. • Presenting the work in International/ National conference or reputed journals.
	SPPD 02	Dissertation Phase- II	2019	<ul style="list-style-type: none"> • Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem. • Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design. • Ability to present the findings of their technical solution in a written report. • Presenting the work in International/ National conference or reputed journals.

Electrical and Electronics Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	EMABS T301	Mathematics –III	2019	<ol style="list-style-type: none"> 1. Solve field problems in engineering involving PDEs. 2. They can also formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
	EEPCT3 02	Electro Magnetic Fields	2019	<ol style="list-style-type: none"> 1. To understand the basic laws of electromagnetism. 2. To obtain the electric and magnetic fields for simple configurations under static conditions.

				<ol style="list-style-type: none"> 3. To analyse time varying electric and magnetic fields. 4. To understand Maxwell's equation in different forms and different media. 5. To understand the propagation of EM waves.
	EEPCT 303	Electrical Circuit Analysis	2019	<ol style="list-style-type: none"> 1. Apply network theorems for the analysis of electrical circuits. 2. Obtain the transient and steady-state response of electrical circuits. 3. Analyse circuits in the sinusoidal steady-state domain (single-phase and three phase). 4. Analyse two port circuit behaviour
	EEPCT 304	Electrical Machines-I	2019	<ol style="list-style-type: none"> 1. Understand the concepts of magnetic circuits. 2. Understand the operation of dc machines. 3. Analyse the differences in operation of different dc machine configurations. 4. Analyse single phase and three phase transformers circuits.
	ECPCT 305	Analog Electronics	2019	<ol style="list-style-type: none"> 1. Understand the characteristics of transistors. 2. Design and analyse various rectifier and amplifier circuits. Design sinusoidal and non-sinusoidal oscillators. 3. Understand the functioning of OP-AMP and design OP-AMP based circuits.
	EOHST 306	Economics	2019	<ol style="list-style-type: none"> 1. At the end of this course, students will demonstrate the ability to 2. Analyse the demand Analysis and Demand forecasting 3. Understand the cost and supply analysis of the products 4. Understand the different market structures and their profit analysis

	PAMCT 310	INDIAN CONSTITUTIONAL RIGHTS	2019	<ol style="list-style-type: none"> 1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. Discuss the passage of the Hindu Code Bill of 1956.
	EEPCT401	Power Systems-I	2019	<ol style="list-style-type: none"> 1. Understand the basic concepts of power systems. 2. Understand the various power system components. 3. Acquire knowledge on different types of generation stations. 4. Acquire knowledge on design of transmission lines 5. Acquire knowledge on transformers and steady state response of synchronous machines
	ECPCT 402	Digital Electronics	2019	<ol style="list-style-type: none"> 1. Understand working of logic families and logic gates. 2. Design and implement Combinational and Sequential logic circuits. 3. Understand the process of Analog to Digital conversion and Digital to Analog conversion. 4. Be able to use PLDs to implement the given logical problem.

ECPCT 403	Signals and Systems	2019	<ol style="list-style-type: none"> 1. Understand the concepts of continuous time and discrete time systems. 2. Analyse systems in complex frequency domain. 3. Understand sampling theorem and its implications.
EEPCT 404	Electrical Machines – II	2019	<ol style="list-style-type: none"> 1. Understand the concepts of rotating magnetic fields. 2. Understand the operation of ac machines. 3. Analyse performance characteristics of ac machines. 4. Determine performance of ac machines
EOHS T405	Accountancy	2019	<ol style="list-style-type: none"> 1. Know the functions of Accounting 2. Understand the financial Analysis 3. Understand the concepts of Depreciation 4. Learn the payback period of capital Budget
EEPC P406	Measurements and Instrumentation Laboratory	2019	<ol style="list-style-type: none"> 1. Design and validate DC and AC bridges. 2. Analyze the dynamic response and the calibration of few instruments. 3. Learn about various measurement devices, their characteristics, their operation and their limitations. 4. Understand statistical data analysis. 5. Understand computerized data acquisition.
EEPCT50 1	Control Systems	2019	<ol style="list-style-type: none"> 1. Understand the modelling of linear-time-invariant systems using transfer function and state-space representations. 2. Understand the concept of stability and its assessment for linear-time invariant systems. 3. Design simple feedback controllers.
EEPCT 502	Power Systems – II	2019	<ol style="list-style-type: none"> 1. Understand the concepts of Compensation in transmission lines. 2. Understand the generation of over-voltages and insulation coordination 3. Understand the various power system components. 4. Evaluate fault currents for different types of faults.
ECPCT50 3	Microprocessors	2019	<ol style="list-style-type: none"> 1. Do assembly language programming. 2. Do interfacing design of peripherals like I/O, A/D,

				D/A, timer etc. 3. Develop systems using different microcontrollers.
	CSPET50 4.1	Computer Organisation and Architecture	2019	<ol style="list-style-type: none"> 1. Understand the concepts of microprocessors, their principles and practices. 2. Write efficient programs in assembly language of the 8086 family of microprocessors. Organize a modern computer system and be able to relate it to real examples. 3. Develop the programs in assembly language for 80286, 80386 and MIPS processors in real and protected modes. 4. Implement embedded applications using ATOM processor.
	EEPET 504.2	Digital Signal Processing	2019	<ol style="list-style-type: none"> 1. Represent signals mathematically in continuous and discrete-time, and in the frequency domain. 2. Analyse discrete-time systems using z-transform. 3. Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms. <p>Design digital filters for various applications.</p>
	EEPET 504.3	MATLAB And SIMULINK	2019	<ol style="list-style-type: none"> 1. To learn the MATLAB environment and its programming fundamentals 2. Ability to write Programs using commands and functions 3. Able to handle and solve the problems using matlab and Able to draw the plots 4. Able to create Simulink model
	EEPCT6 01	Power Systems -III	2019	<ol style="list-style-type: none"> 1. Use numerical methods to analyse a power system in steady state. 2. Understand stability constraints in a synchronous grid. 3. Understand methods to control the voltage, frequency and power flow. 4. Understand the monitoring and control of a power

				system. 5. Understand the basics of power system economics.
	EEPCT-602	Power Electronics	2019	<ol style="list-style-type: none"> 1. Understand the differences between signal level and power level devices. 2. Analyse controlled rectifier circuits. 3. Analyse the operation of DC-DC choppers. 4. Analyse the operation of voltage source inverters.
	EEPET 603.2	Electrical Machine Design	2019	<ol style="list-style-type: none"> 1. Understand the construction and performance characteristics of electrical machines. 2. Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machines 3. Understand the principles of electrical machine design and carry out a basic design of an ac machine. 4. Use software tools to do design calculations.
	EEPET 603.3	Special Machines	2019	<ol style="list-style-type: none"> 1. understand field aspects of electrical machines 2. understand the operation and control of <ol style="list-style-type: none"> (i) stepper motors (ii) BLDC motors (iii) SR motors
	EEPET 604.1	Control Systems Design	2019	<ol style="list-style-type: none"> 1. Design controllers to satisfy the desired design specifications using simple controller structures (P, PI, PID, compensators). 2. Controller design with time domain and frequency domain approach. 3. Design controllers using the state-space approach.
	EEPET 604.2	Digital Control Systems	2019	<ol style="list-style-type: none"> 1. Obtain discrete representation of LTI systems. 2. Analyse stability of open loop and closed loop discrete-time systems. 3. Design and analyse digital controllers. 4. Design state feedback and output feedback controllers.
	EEPET 604.3	PLC's and Applications	2019	<ol style="list-style-type: none"> 1. understand applications of PLCs and different types of PLCs 2. use Easy Veep software

				<ul style="list-style-type: none"> 3. learn hardware details of Allen bradely PLC 4. programming of PLCs
	MGHST606	Management Science	2019	<ul style="list-style-type: none"> 1. Work more creatively, work in groups 2. Presenting ideas more effectively and efficiently in formal and informal ways 3. Development of fundamental rethinking and radical redesign in the organizations. 4. Applying the ideas of the course to identifying and solving real world problems. 5. Development of Group Dynamic Skills.
	ECPCP608	Electronics Design Laboratory	2019	<ul style="list-style-type: none"> 1. Understand the practical issues related to practical implementation of applications using electronic circuits. 2. Choose appropriate components, software and hardware platforms. 3. Design a Printed Circuit Board, get it made and populate/solder it with components. Work as a team with other students to implement an application.
	EEPET 701.1	Power System Protection	2019	<ul style="list-style-type: none"> 1. Understand the different components of a protection system. 2. Evaluate fault current due to different types of fault in a network. 3. Understand the protection schemes for different power system components. 4. Understand the basic principles of digital protection. 5. Understand system protection schemes, and the use of wide-area measurements.
	EEPET 701.2	Advanced Microprocessors	2019	<ul style="list-style-type: none"> 1. learn architectural differences between different Intel processors 2. learn different types of RISC processors 3. know PC hardware and its overview
	EEPET 701.3	Line-Commutated and Active Rectifiers	2019	<ul style="list-style-type: none"> 1. Understand the operation offline commutated rectifiers– 6 pulse and multipulse configurations.

				2. Understand the operation of PWM rectifiers – operation in rectification and regeneration modes and lagging, leading and unity power factor mode.
	EEPET 702.1	Electrical Drives	2019	<ol style="list-style-type: none"> 1. Understand the characteristics of dc motors and induction motors. 2. Understand the principles of speed-control of dc motors and induction motors. 3. Understand the power electronic converters used for dc motor and induction motor speed control
	EEPET 702.2	Power System Dynamics and Control	2019	<ol style="list-style-type: none"> 1. Understand the problem of power system stability and its impact on the system. 2. Analyze linear dynamical systems and use of numerical integration methods. 3. Model different power system components for the study of stability. 4. Understand the methods to improve stability.
	EEPET 702.3	High Voltage Engineering	2019	<ol style="list-style-type: none"> 1. Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials. 2. Knowledge of generation and measurement of D. C., A.C., & Impulse voltages. Knowledge of tests on H. V. equipment and on insulating materials, as per the standards. 3. Knowledge of how over-voltages arise in a power system, and protection against these over-voltages.
	EEPET 801.1	HVDC Transmission Systems	2019	<ol style="list-style-type: none"> 1. Understand the advantages of dc transmission over ac transmission. 2. Understand the operation of Line Commutated Converters and Voltage Source Converters. 3. Understand the control strategies used in HVDC

				transmission system. 4. Understand the improvement of power system stability using an HVDC System.
	EEPET 801.2	Power Quality and FACTS	2019	1. Understand the characteristics of ac transmission and the effect of shunt and series reactive compensation. 2. Understand the working principles of FACTS devices and their operating characteristics. 3. Understand the basic concepts of power quality. 4. Understand the working principles of devices to improve power quality.
	EEPECT 801.3	Advanced Electrical Drives	2019	1. To understand the operation of power electronic converters and their control Strategies. 2. To understand the vector control strategies for ac motor drives 3. To understand the implementation of the control strategies using digital Signal processors.
	EEOET-802.1	Electrical Energy Conservation and Auditing	2019	1. Understand the current energy scenario and importance of energy conservation. 2. Understand the concepts of energy management. 3. Understand the methods of improving energy efficiency in different electrical systems. 4. Understand the concepts of different energy efficient devices.
	EEPET 802.2	ARM Architecture and Programming	2019	1. Understand architecture and addressing modes of ARM processor 2. Write assembly programs for ARM processor 3. Learn coprocessor instructions and memory management 4. Use different tools for programming ARM processor with its peripherals
	EEPET 802.3	Principles of Communication	2019	1. Work on various types of modulations. Should be able to use these communication modules in

		System s		implementation. 2. Will have a basic understanding of various wireless and cellular, mobile and telephone communication systems
	EEOET01	Power Plant Engineering	2019	<ol style="list-style-type: none"> 1. To provide an overview of coal based thermal power plants and gas turbine and combined cycle power plants. 2. To provide an overview of nuclear power plants and hydro electric power plants and the associated energy conversion issues.
	EEOET 03	Neural Network And Fuzzy Logic	2019	<ol style="list-style-type: none"> 1. To provide students basic knowledge on Artificial Neural Networks and learning rules. 2. To provide students basic knowledge on supervised learning. 3. To make students understand fundamentals of fuzzy logic and fuzzy sets. 4. To provide students basic knowledge on design of fuzzy systems. 5. To provide students good knowledge on Neuro-fuzzy modelling.
	EEOET04	Renewable Energy Systems	2019	<ol style="list-style-type: none"> 1. Introduce aspects of different Energy Sources and Energy scenario in India. 2. Understand the Particulars of solar energy and collectors. 3. Understand the Essentials of the solar energy storage and application of solar energy. 4. Understand the Fundamentals of Biomass energy systems, analysis and testing. 5. Know the Details of wind energy, wind turbines and their controls.
	EEOET 05	Industrial Electrical Systems	2019	<ol style="list-style-type: none"> 1. Understand the electrical wiring systems for residential, commercial and industrial consumers, representing the systems with standard symbols and

				drawings, SLD. 2. Understand various components of industrial electrical systems. 3. Analyze and select the proper size of various electrical system components.
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MECHANICAL ENGINEERING M.Tech (Production Engineering)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	PEPC 01	Advanced Manufacturing Processes	2019	1 .Students can able to demonstrate different unconventional machining processes 2. Able to test the influence of different process parameters on the performance and their applications 3. Able to select the different types of composites for different applications
	PEPC 02	Advanced material technology	2019	1. Students are capable to define the concept of materials i.e., conventional materials with their structure, such as electronic configuration, structure of atom, etc. 2. Students become aware of different conventional materials such as metallic and non metallic materials, structures and their applications. 3. Students will be able to demonstrate the need for newer materials by comparing the limitations of conventional materials. 4. They will be able to compare the types of newer materials along with their properties and applications. 5. They will be able to compile about the properties, structure of ceramic materials and their need for newer applications and processing techniques.

	Professional Elective- I Any One from the Following		2019	
	PEPE 11	Applied Probability and Statistics	2019	<ol style="list-style-type: none"> 1. Basic concepts of sampling applied in population enumeration. 2. Regression techniques for application and forecast the demand and related variables 3. Testing of hypothesis using statistical distributions. Correlation between the observed values and experimental values for analysis of variance
	PEPE 12	Operations Planning and Control	2019	<ol style="list-style-type: none"> 1. Forecasting principles and techniques for short range and long range planning 2. Production requirements for each product and plan the shop floor activities 3. Work station loading and scheduling of paths to avoid bottle necks for smooth production 4. Solution for product mix decision using OR techniques. 5. Optimal job sequences to achieve the minimum make span with maximum production output
	PEPE 13	Advanced Casting Technology	2019	<ol style="list-style-type: none"> 1. Knowing and identification of materials for moulding the additives, coating and the methods of sand controls 2. Identification of different furnaces for metal melting and design the suitable furnace depending materials 3. Understanding of the concepts related to the casting processes and the factor those influence the design process for metals and alloys 4. Knowing the various properties of liquid metals and

				<p>their compositions and attain the various alloys depending upon the temperature, Iron-carbon diagram</p> <p>5. Understanding the principles of mechanization of foundries with their layouts and purchase of suitable layout</p>
	PEPE 21	Robotics	2019	<ol style="list-style-type: none"> 1. Importance of robotics in today and future goods production 2. Robot configuration and subsystems 3. Principles of robot programming and handle with typical robot 4. Working of mobile robots 5. The Student must be able to design automatic manufacturing cells with robotic control using the principle behind robotic drive system, end effectors, sensor, machine vision robot kinematics and programming.
	PEPE 22	Design for Manufacturing	2019	<ol style="list-style-type: none"> 1. Design components for machining. 2. Simulate the casting design and choose the best casting process for a specific product. 3. Evaluate the effect of thermal stresses in weld joints. 4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation mechanisms. 5. Design plastic components for machining and joining and selecting a proper processes for different joining cases.
	PEPE 23	Metrology & Computer	2019	<ol style="list-style-type: none"> 1. Metrology, quality control and Inspection so that they can meet the challenges in the industries. 2. Various instruments and measuring systems with the help of laser and other

				<p>advanced computer integrated systems.</p> <p>3. Students will be able to measure any type of features, forms with the help of CMM.</p>
	PECP 01	Production Engineering Lab – I	2019	<ol style="list-style-type: none"> 1. Describe the geometry of single point cutting tool. 2. Apply knowledge of metal cutting to perform various machining operations. 3. Explain the working and use of various components of conventional machine tools. 4. Identify the sequence of operation to process a job.
	PECP 02	CAD Lab	2019	<ol style="list-style-type: none"> 1. Draw complex geometries of machine components in sketcher mode. 2. Create complex engineering assemblies using appropriate assembly constraints. 3. Develop G and M codes for turning and milling components. 4. Generate automated tool paths for a given engineering component. 5. Generate automated tool paths for a given engineering component.
	PGMC 01	Research Methodology and IPR	2019	<ol style="list-style-type: none"> 1. Understand research problem formulation. 2. Analyze research related information 3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 4. Understanding that when IPR would take such important place in growth of individuals & Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.

				<p>5. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.</p>
	PEPC 03	Computer Integrated Manufacturing	2019	<ol style="list-style-type: none"> 1. Understand the effect of manufacturing automation strategies and derive production metrics. 2. Analyze automated flow lines and assembly systems, and balance the line. 3. Design automated material handling and storage systems for a typical production system. 4. Design a manufacturing cell and cellular manufacturing system. 5. Develop CAPP systems for rotational and prismatic parts.
	PEPC 04	Metal Cutting Tool Design	2019	<ol style="list-style-type: none"> 1. Ability to extend, through modeling techniques, the single point, multiple point and abrasive machining processes 2. Estimate the material removal rate and cutting force, in an industrially useful manner, for practical machining processes 3. Prediction of the surface finish in machining processes 4. Understand the practical aspects of tool wear and tool life, and their influence on economics <p>Understand the tool and work piece temperatures and their effect on quality</p>
	PEPE 31	Automation Manufacturing	2019	<ol style="list-style-type: none"> 1. Solve the line balancing problems in the various flow line systems with and without use buffer storage 2. Understand the different automated material

				<p>handling, storage and retrieval systems and automated inspection systems.</p> <p>3. Use of Adaptive Control principles and implement the same online inspection and control</p>
	PEPE 32	Metal Forming Technology	2019	<p>1. Metal forming fundamentals and applications.</p> <p>2. Metal forming mechanics.</p> <p>3. Workability of testing techniques.</p> <p>4. Tribology in metal forming and other phenomena</p>
	PEPE 33	Additive Manufacturing	2019	<p>1. Identify the need for time compression in product development and manufacturing.</p> <p>2. Model and fabricate any complex engineering product.</p> <p>3. Select the rapid manufacturing technology for a given application.</p> <p>4. Minimize various errors that are occurring during conversion of CAD models.</p> <p>5. Illustrate the working principles of various rapid manufacturing technologies.</p> <p>6. Optimize the quality of parts produced by the various rapid manufacturing technologies.</p>
	PEPE 41	Energy Management	2019	<p>1. Understanding basics of demand side management and mechanisms (technical, legal or financial) that influence energy consumption.</p> <p>2. Recognizing opportunities for increasing rational use of alternative energies.</p> <p>3. Learning the basics of energy auditing with application on different sectors.</p> <p>4. Able to take the decisions in budget estimations and evaluate risk analysis</p>

2.6.1: The institution has stated learning outcomes (generic and programme specific)/graduate attributes which are integrated into the assessment process and widely publicized through the website and other documents

2018-2019

SVU COLLEGE OF ARTS

1. Adult & Continuing Education

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	MAAE -1.1	Alternative Learning Systems	2018	1.Remembrance of different forms of learning. 2.Application of different technology support services for effective learning. 3.Organization and administration of nonformal education programmes. 4.Evaluation of nonformal education programmes.
2	MAAE-1.2	Policy Studies In Adult/Continuing Education	2018	1. Identify the socio-political movements during pre-independence period for the promotion of literacy. 2.Analyze the trends of adult education programmes during post-independence period from social education to saakshar Bharat Mission. 3.Describe the National and International organizations efforts for the promotion of literacy at various levels. 4.Ex plain the State & Central Govt policies on adult education and special reference to literacy, post-literacy and continuing education.
3	MAAE-1.3	Adult Psychology And Learning	2018	1: Acquire knowledge on psychological foundations and its relevance to Adult Education and Learners. 2: Learn classification of motives and motivation techniques to motivate the Adult Learner. 3: Compare the Adult Personality & Child personality based on three Domain principles. 4: Examine the Adult Learning characteristics and theories of

				learning, eventually he/she will apply all aspects in adult class room activity.
4	MAAE-1.4	Socio-Philosophical Foundatons Of Adult Education	2018	<ol style="list-style-type: none"> 1. Create thinking capacity to survival in the present society with philosophical approach. 2. Know great eminent leaders biography, sacrifices their lives for society. 3. Aware Dalit movement, women movement, co-operative movement in society especially rural areas. 4. Examine the problems of society with reference to bonded labor, child labour, untouchability, transgender and provide awareness on human rights.
5	MAAE-1.5	Communication Methods in Adult Education	2018	<ol style="list-style-type: none"> 1. Remembering the concept and methods of communication and their application to adult Education 2. Identifying different models of communication. 3. Describing the media of communication and their utility in continuing education. 4. Realising the use of different Audio-visual aids in teaching learning process.
6	MAAE-1.6	Human Values And Professional Ethics-I	2018	<ol style="list-style-type: none"> 1. know the importance of professional ethics and to implement the ethical values in various professions. 2. understand about the Good and bad values and to analyze the basic moral concepts. 3. inculcate the students in the aspects of pursharthas . 4. Know different crimes and its impact on personal and social life and theories of punishment
7	MAAE-2.1	Recent Trends In Adult And Continuing Education	2018	<ol style="list-style-type: none"> 1. Identify the variations of literacy growth among States and Nation with reference to gender, rural and urban. 2. Recognize the functions, activities of JSS and Saakshar Bharat Mission, to promote Life Long learning. 3. Understand the five-year plan period programmes in terms of literacy, non-formal and functional literacy.

				4. Examine the significance of the extension activities as third dimension of literacy programmes at field level.
8	MAAE-2.2	Curriculum And Methods Of Literacy Teaching	2018	<ol style="list-style-type: none"> 1. Remembering the meaning, foundations and theories of curriculum development with reference to adult learners. 2. Distinguishing different principles and approaches of curriculum development. 3. Interpreting the needs and interests of lifelong learners. 4. Executing to evaluate Adult Education programmes
9	MAAE-2.3	Research Methods In Adult Education	2018	<ol style="list-style-type: none"> 1. Understanding the concepts and methods of research. 2. Adopting the suitable sampling methods for research studies. 3. Developing tools for research studies. 4. Ability of research report writing.
10	MAAE-2.4	Field Work & Practical Assignments	2018	<p>Application of knowledge and skills in project designing</p> <ol style="list-style-type: none"> 2.Ability to do research work. 3.Finding solutions to the problems identified in his research work. 4.Preparing the research report.
11	MAAE-2.5	Management Of Adult/Continuing Education	2018	<ol style="list-style-type: none"> 1. Know the principles of Management, Planning and Organizing capacity to conduct Adult Education Programmes. 2. Develop Social and Communication Skills to organize village, Mandal, District, State and Central level programmes.

				<ol style="list-style-type: none"> 3. Acquire project techniques for sustainable programmes. 4. Learn and enhance research skills to write project report, monitoring and evaluation of data of Adult Education Programme.
12	MAAE-2.6	Human Values And Professional Ethics-Ii	2018	<p>Understand and recognize the importance of Value Education & Human Values and also try to follow the traditional values of family, women and elders in the society.</p> <p>2: Examine code of ethics for medical and health care professionals. They Can sensitize the rural people on Health Issues & Problems.</p> <p>3: Explain the Environmental Protection and relationship between Man and Nature, causes of pollution and impact on environmental health.</p> <p>4: Recognize the need of Social ethics and fight against the anti-social activities, Organ trade, Human trafficking etc.</p>
13	MAAE-3.1	Training In Adult And Continuing Education	2018	<ol style="list-style-type: none"> 1. Identify the importance of training in Adult and Continuing Education programmes and differences between training and education. 2. Know the training methods, training materials to organize the Adult and Continuing Education programmes. 3. Follow the teaching methods like Lecture, discussion, demonstration and Role Play methods. 4. Recognize training facilities at different levels like National, State, District and Local.
14	MAAE-3.2	Comparative Studies In Adult Education	2018	<ol style="list-style-type: none"> 1: Compare the Adult Education Programmes of different countries based on its aims and significance. 2: Compare and contrast of Adult Education movement and progress in different countries like UK, USA, Denmark etc with reference to India. 3: Find out the similarities and dissimilarities of Adult

				Education Programs in selected countries. 4: Identify the problems of Adult Education in terms of Planning, Organization and Budget activities in developing countries and India.
15	MAAE-3.3	Material Development For Adult And Continuing Education	2018	<ol style="list-style-type: none"> 1. Identify the significance of learning materials in Adult Education classes. 2. Design the teaching learning activity objectives for better performance of Teacher educator in Adult Education Programmes. 3. Enhance language forms and competence and tune with the needs of the learner. 4. Develop teaching learning materials for self-learning
16	MAAE-3.4a	Peoples' participation And Development	2018	<ol style="list-style-type: none"> 1. Analysing the role and functions of people committees, 2. Understanding the functions of Panchayat Raj institutions. 3. Knowledge on the role of co-operatives in rural development. 4. Ability to catalyse the performance of PRIs and co-operatives.
17	MAAE-3.4b	Vocational Education And Skill Development	2018	<ol style="list-style-type: none"> 1. Identify the relationships of Vocational Education and Adults development. 2. Understand the institution training importance and its practices in vocational training. 3. Identify the issues of Rural Vocational training in India and Asian Countries. 4. Provide Vocational Guidance and Counselling for

				Adult trainees.
18	MAAE-3.4c	Guidance And Counselling In Adult And Continuing Education	2018	<ol style="list-style-type: none"> 1. Remembering the concept and theories and perspectives of guidance and counselling in educational process. 2. Recollecting understanding and analysis of educational problems of a clientele group. 3. Knowing the roles and functions of guidance counsellor. 4. Analysing the use of computers and internet in guidance and counselling.
19	MAAE-4.1	Monitoring And Evaluation	2018	<ol style="list-style-type: none"> 1. Identify the concept of monitoring and monitoring systems in adult education 2. Describe the different evaluation models. 3. Demonstrate the tools and techniques of evaluation. 4. Understand the importance of learner evaluation.
20	MAAE-4.2	Human Resource Development And Management In Lifelong Learning	2018	<ol style="list-style-type: none"> 1. Understand the importance of human resource development and its historical background. 2. Analyze the human capital and its functions in Adult Education. 3. Explain the cost benefit process and problems of measurements. 4. Identify the need of planning in human resource development and relation to Adult Education.
21	MAAE-4.3a	Environment And Education	2018	<ol style="list-style-type: none"> 1. Understand the fundamental aspects of environment and need of environmental protection. 2: Interpret the environmental crisis with reference to pollutions and its impact of human life need of Environmental Conservation. 3: Know the environmental laws and role of individual and

				community to Control environmental pollution. 4: Explain Ecology and eco factors for Ecological Balance.
22	MAAE-4.3d	Population Education	2018	<ol style="list-style-type: none"> 1. Recollecting the concepts, needs and importance of population related terminologies. 2. Analysing the causes and consequences of population growth. 3. Distinguishing the roles of different agencies in promotion of population education and control. 4. Identifying the different National population policies and influences fertility, mortality and migration.
23	MAAE-4.4	Dissertation / Project Work	2018	<p>Application of knowledge and skills in project designing</p> <ol style="list-style-type: none"> 2.Ability to do research work. 3.Finding solutions to the problems identified in his research work. 4.Preparing the research report.

2. Ancient Indian History, Cultural Archeology

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
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1.	AIHC&A- 101	History of Ancient India upto 550 A.D.	2018	<ul style="list-style-type: none"> ➤ Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto 550 C.E. ➤ Student will also be well versed with different analytical approaches
2	AIHC&A- 102	History of India from 1206 A.D. to	2018	<ul style="list-style-type: none"> ➤ Students can familiarize in understanding the continuity with changes in all spheres of history and culture under the Delhi sultanates. ➤ Students can able to assess the contribution of sultanates to Indian
3	AIHC&A- 103	History of Andhras upto 1323 A.D.	2018	<ul style="list-style-type: none"> ➤ The study of comprehensive history of the country is incomplete without the study of regional history. ➤ Regional history is becoming more and more popular, for it has inherit potential of tapping varied kinds of sources for understanding the divergent aspects of local heritage and culture. ➤ The students can develop thorough understanding on Ancient
4	AIHC&A- 104	Ancient World Civilizations.	2018	<ul style="list-style-type: none"> ➤ Students gain familiarity with the rise and characteristic features of the ancient world ➤ Civilizations, its regional extent and variation ➤ Students can understand the glory of the civilizations, the nature of its

5	AIHC&A- 105	(A) Principles and Methods of Archaeology.	2018	<ul style="list-style-type: none"> ➤ Students can develop a strong foundation on the basic understanding of the nature, fundamentals, development and value of archaeology as a discipline. ➤ Familiarized with basic descriptive technique and preliminary study of various categories of objects and the practical methods of doing Archaeological work
6	AIHC&A- 105 B	(B) Advanced Archaeological Theory and Research Methodology	2018	<ul style="list-style-type: none"> ➤ The student will be able to understand the basic features of various theories and thoughts used in archaeological interpretations. ➤ They can formulate a research proposal and decide on appropriate materials and methods of analysis. ➤ They can present the findings and the process of conducting research in written and verbal formats. ➤ Students get acquainted with various developmental phases of the Indian social institutions and their significance in human life and values ➤ It helps to understand the concepts of Political institutions in Ancient India and their significance.

7	Elective foundation 106	A) SOCIAL AND POLITICAL INSTITUTIONS IN ANCIENT	2018	<ul style="list-style-type: none"> ➤ Students get acquainted with various developmental phases of the Indian social institutions and their significance in human life and values ➤ It helps to understand the concepts of Political institutions in Ancient India and their significance.
8	AIHC&A- 107	Human Values and Professional Ethics- I.	2018	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at
9	AIHC&A- 201	History of India from 550 A.D to 1206 A.D.	2018	<ul style="list-style-type: none"> ➤ Students can develop comprehensive knowledge on political, social, economic, religious and cultural history of early medieval India , regional polities and its impact ➤ Students can also able to understand the circumstances lead to the invasions of ➤ Arabs and foundation of Muslim rule in India.

10	AIHC&A- 202	History of Medieval India from 1526 A.D to 1707 A.D.	2018	<ul style="list-style-type: none"> ➤ Students can understand thoroughly the Mughal conquest of India, their rule and legacy. ➤ The study help the students to assess the achievements and contribution of Mughals to Indian history and culture
11	AIHC&A- 203	History of South India from 1323 A.D. to 1724 A.D.	2018	<ul style="list-style-type: none"> ➤ This course provides comprehensive knowledge on the last imperial political formation in South India and the history of Vijayanagara, Bahmani and contemporary pretty powers. ➤ It helps to understand with the context of polity, economy, culture, religious and ideological changes
12	AIHC&A- 204	Pre and Proto Historic Cultures of India	2018	<ul style="list-style-type: none"> ➤ Students will develop a strong foundation and critical understanding of the pre-proto cultures of India ➤ They will be able to situate Indian materials within wider archaeological debates

13	AIHC&A- 205 (A) AIHC&A- 205 (B)	(A) History of Indian Archaeology (B) Cultural Heritage Management	2018	<ul style="list-style-type: none"> ➤ Students will familiarize in understanding the history of archaeological studies and its progress from its inception up to recent trends. ➤ Help the students in assessing the services rendered by pioneers of archaeologists ➤ It also helps to understand archeological studies in pre and post Independence and emergence of various branches. ➤ Students can understand well the concept of cultural heritage, world and heritage monuments in India conservation and promotion of
14	AIHC&A- 206 (A)	(A)India's Early Cultural Contacts with other Countries	2018	<ul style="list-style-type: none"> ➤ Cross regional cultural diffusion has been an important aspect of historical evolution. ➤ A strong and vibrating civilization having its impact felt upon other contemporary cultures has been a common phenomenon of history ➤ The students were able to understand the influence of Indian culture on Central ➤ Asia, south east asia, Japan, Tibet, Persia, Greece, Rome, Indo- China ➤ Students can be able to understand thoroughly the Early History of

15	AIHC&A- 206(B)	B) Early History of South East Asia	2018	<ul style="list-style-type: none"> ➤ Students can be able to understand thoroughly the Early History of South East asia ➤ the contacts between India and South East Asia in terms of Cultural, religions and economic exchanges ➤ Student can be well versed in assessing the India's early cultural contacts and its influence in South East Asia
16	AIHC&A -207	Human Values and Professional Ethics- II	2018	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at large.
17	AIHC&A- 301	History of Indian Architecture	2018	<ul style="list-style-type: none"> ➤ Students will able to understand the evolution of architecture in India and their ➤ transformation through the ages in their religious, regional and stylistic context. ➤ Can gain theoretical knowledge about the basic philosophy, fundamental aspects and multifaceted nature of Architecture.

18	AIHC&A- 302	Epigraphy	2018	<ul style="list-style-type: none"> ➤ Students will be able to understand the profession knowledge on decipher and read scripts; assess the date of inscriptions with the help of paleographic features. ➤ Able to understand the different languages used in inscriptions,
19	AIHC&A- 303(A)	(A) History of Modern Andhra from 1724 A.D. to 1956 A.D.	2018	<ul style="list-style-type: none"> ➤ The students can understand the history of Andhra as well the history of Hyderabad state under company and crown rule. ➤ Assess the role of Andhras in the freedom movement ➤ Acquire thorough knowledge on the causes and course of the
20	AIHC&A- 303(B)	(B) Historiography and Historical Method	2018	<ul style="list-style-type: none"> ➤ It provides a critical overview of one of the most dynamic areas of modern historical inquiry—global history. ➤ The students can familiarize with historical studies, the theories and methods used in the practice of history writing. ➤ Students also gain foundation knowledge on Historical Methods
21	AIHC&A- 303(C)	(C) Laboratory Methods in Scientific Archaeology	2018	<ul style="list-style-type: none"> ➤ Students are familiarized with basic descriptive technique and Preliminary study of various categories of objects studied by archaeologists, such as lithics, pottery, plant fossils, human remains, rocks and minerals sediments, map reading
22	AIHC&A- 303(D)	(D) Temple Studies	2018	<ul style="list-style-type: none"> ➤ Students can be familiar in understanding the temple culture, knowledge on the forms of worship, origin and development of image worship, temples and their role in social, economic, religious, cultural history and professional groups involved in its functions and

23	AIHC&A-304	Soft Skills in Archaeology	2018	<ul style="list-style-type: none"> ➤ The students can acquire knowledge on the basics of computer and its usage in general ➤ They can expertise the working skills in computational archaeology and be able to equip for future research and enhance employability.
24	AIHC&A-305(A)	(A) Outlines of Indian History	2018	<ul style="list-style-type: none"> ➤ The non-history students as an external elective course become familiar in understanding the broad phases of Indian history and culture
25	AIHC&A-305(B)	(B) Women in Indian History	2018	<ul style="list-style-type: none"> ➤ The students can acquire knowledge course on the sources for the study of women history, their role in social and religious movements since the ages, progress of education, economy their role in cultural institutions and analyses women centered issues with historical context
26	AIHC&A-401	History of Indian Art	2018	<ul style="list-style-type: none"> ➤ Students become familiar with the monuments and their sculptures, art forms, features, styles and art schools of India during the period covered in the course.
27	AIHC&A-402	Numismatics	2018	<ul style="list-style-type: none"> ➤ Students will be able to identify and decipher the coins. ➤ They will also be able to understand the socio-political background that accurse through the coinage of that time; thus getting holistic picture of economic and monetary system prevalent

28	AIHC&A- 403(A)	(A) Museology	2018	<ul style="list-style-type: none"> ➤ Students can learn the basic nature, functions of museums and their activities. ➤ The students were able to acquire the essential skills and knowledge needed for Museum profession
29	AIHC&A- 403(B)	(B) Historical Applications in Tourism	2018	<ul style="list-style-type: none"> ➤ The students can familiarize the knowledge needed to excel in tourism activities. ➤ It will equip the students with the solid foundation to build upon the fundamentals, useful skills and expertise that can assist employment in Tourism Industry
30	AIHC&A- 403(C)	(C) Tour Guiding and Management	2018	<ul style="list-style-type: none"> ➤ The students can familiarize the knowledge needed to tourism guide activities. ➤ It will equip the students with the solid foundation to build upon the fundamentals of tour guide, useful skills and expertise that can assist employment in Tourism Industry

31	AIHC&A- 403(D)	(D) Conservation of Cultural Property	2018	<ul style="list-style-type: none"> ➤ The student can equip with various methods and techniques followed in the Conservation and Preservation of Cultural Property. ➤ The students were able to possess the essential skills and knowledge that can assist employment in Archaeology and museum as conservator
32	AIHC&A- 404	History of Science and Technology in Ancient India	2018	<ul style="list-style-type: none"> ➤ Students will be able to understand the history of science and technology and its progress through the ages, introduction and impact of the stone and metal ages and nature of scientific developments in ancient India. ➤ They also acquire the knowledge on the history of Mathematical Sciences and Ayurveda

33	AIHC&A- 405(A)	(A) Introduction to Indian Archaeology	2018	<ul style="list-style-type: none"> ➤ The external elective students can acquire the knowledge about the importance of archeological studies, its relevance to other sciences. ➤ Will become familiar to understand the importance of epigraphy and numismatics in the reconstruction of history
34	AIHC&A- 405(B)	(B)History of Vijayanagara Empire	2018	<ul style="list-style-type: none"> ➤ The non-history student as an external elective can familiar in understanding the history of Vijayanagara empire and their contribution to south Indian culture

3. Area Studies Programme

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes

1	SEAPS-101	Early Cultural History of Southeast Asia	2018	<p>Students understand the causes for the spread of Indian culture in Southeast Asia</p> <p>Know the different Indian dynasties of the past in Southeast Asia</p> <p>Students will be able to learn the impact of Indian cultural on</p>
2	SEAPS-102	Regional Geography of Southeast Asia	2018	<p>Students understand geographical profile of different countries of Southeast Asia.</p> <p>Know the trends in population movement within Southeast Asia</p> <p>Students will be able to assess location significance and various infrastructural developments</p>
3	SEAPS-103	Colonization of Southeast Asia	2018	<p>Students will have adequate knowledge on rise and fall of Portuguese</p> <p>Students differentiate the colonial powers that ruled Southeast Asia</p> <p>Critically observe Thailand's Political, Economic transformation and maintaining independence</p>
4	SEAPS-104	Ancient Indian History up to 1206 A.D.	2018	<p>Students comprehend ancient Indian History, Indus Valley Civilization, Vedic Culture and Jainism and Buddhism. Know the rise of different Dynasties and contribution to Indian Culture. Gain knowledge on various Muslim Invasions and affects</p>

5	SEAPS-105	Modern European History, 1870-1991	2018	Differentiate volatile political situation in Europe Earn broad understanding of Bismarck and consolidation of the
6	SEAPS-106	Human Values and Professional Ethics-I	2018	<ul style="list-style-type: none"> ➤ Students understand the causes for the spread of Indian culture in Southeast Asia. ➤ Know the different Indian dynasties of the past in Southeast Asia. ➤ Students will be able to learn the impact of Indian cultural on Southeast Asian societies
7	SEAPS-201	Contemporary Cultural History of Southeast Asia	2018	<p>Students list the Christian Missionary activities in Southeast Asian countries.</p> <p>2) Knows the factors of Indian Emigration, and Chinese economic contribution in Southeast Asia.</p> <p>Comprehensive grasp over different cultures and religions in Southeast</p>
8	SEAPS-202	Modern History of China, 1839-1976	2018	<p>Students know Western contacts, rebellions and reforms in China</p> <p>Advanced understanding on Sun Yat Sen, Chiang Kai-Shek and Mao Tse-Tung</p> <p>Distinguish Reconstruction and Consolidation of China and its foreign relations</p>

9	SEAPS-203	Regional Geography of South Pacific & East Asia	2018	<p>Students identify physical setting, landforms, climate and soils of South Pacific.</p> <p>Comprehend on Australia, New Zealand, Japan and China</p> <p>Recognize the economic trends in South Pacific and East Asian nations</p>
10	SEAPS-204	Medieval Indian History 1206 A.D.–1707 A.D	2018	<p>Students will gain knowledge on Major dynasties of Medieval India</p> <p>Students know the great Indian rulers of Medieval period</p> <p>Students comprehend the advent of Europeans</p>
11	SEAPS-205	Modern Indian History 1757-1965	2018	<p>Students understand Indian sub-Continent and the Europeans arrival</p> <p>2) Students distinguish the causes for the rise of nationalism and various phases of Independence movement.</p> <p>3) Gain adequate knowledge on Gandhian Era, Independence and post independent-India</p>
12	SEAPS-206	Human Values and Professional Ethics-II	2018	<p>Understand causes for the rise of nationalism and movements in different Southeast Asian countries</p> <p>Earn knowledge on the Japanese Occupation of Southeast Asia during the Second World War</p> <p>Analyze the course Course and outcome of Nationalist movements in</p>

13	SEAPS-301-A	a) Nationalism in Southeast Asia	2018	<ul style="list-style-type: none"> ➤ Understand causes for the rise of nationalism and movements in different Southeast Asian countries ➤ Earn knowledge on the Japanese Occupation of Southeast Asia during the Second World War
14	SEAPS-301-B	b) Indochina (Cambodia, Laos & Vietnam) 1802-2000	2018	<ul style="list-style-type: none"> ➤ Students will learn early Western contacts and establishments of French protectorates over Indochina states. ➤ Gain knowledge on French Administration and freedom movements in Indochina. ➤ Knows global politics during Cold War and its effects on
15	SEAPS-301-C	c) Geopolitics of Asia-Pacific Region	2018	<ul style="list-style-type: none"> ➤ Students will understand the meaning of geopolitics ➤ Essence of Cold War will be understood thoroughly ➤ Will learn about Post Cold War politics
16	SEAPS-302-A	a) Modern History of Japan 1854-1975	2018	<ul style="list-style-type: none"> ➤ Students acquaint knowledge on Opening of Japan and its early western contacts. ➤ Knows Japan's militarization, Russo Japanese war and the First World War ➤ Gain knowledge on US Occupation of Japan and Post World War-II

17	SEAPS-302-B	b) East Asian Developments – Post Cold War	2018	<ul style="list-style-type: none"> ➤ Comprehend on the disintegration of Soviet Union and Emergence of New World Order. ➤ Ability to analyze security concerns in the post Cold War and perceptions of China, Japan and North Korea.
18	SEAPS-302-C	c) Indian Diaspora	2018	<ul style="list-style-type: none"> ➤ Know the reasons of Indian migration to Southeast Asian countries. ➤ Learn Indian migrant’s socio-economic contribution to host nations. ➤ Focus on the role of Indian Diaspora in National Reconstruction and image building in host countries
19	SEAPS-302-D	d) International Relations	2018	<p>Students know the meaning, nature and scope of International Relations</p> <p>2) Gain knowledge on the Cold War and New International Economic Order.</p>
20	SEAPS-303-A	(a) India and the World	2018	<p>Develop understanding of Non-Aligned Policy under Jawaharlal Nehru and Indira Gandhi</p> <p>2) Build knowledge on India’s Role in the United Nations</p> <p>3) Advance understanding on India’s relations with the US,</p>

21	SEAPS-303-B	(b) Emerging Asia and the World	2018	<ul style="list-style-type: none"> ➤ Develop understanding of Economic and Social Progress in Asia and also Economic crisis and Recovery of Asia ➤ Comprehensive grasp over Foreign Direct Investments in Asia, Rise of China and also about India's Look East Policy. ➤ Comprehend on Regionalism and regional organizations like
22	SEAPS-401-A	a) Regional Cooperation in Southeast Asia	2018	<p>) Students learn about early organizations like ASA, SEATO and MAPHILINDO.</p> <p>2) Develop understanding on the evolution of ASEAN from 5 to 10 members</p> <ul style="list-style-type: none"> ➤ 3) Focus on the ASEAN Summit Meetings, ARF and AFTA
23	SEAPS-401-B	b) Economic Landscape of Asia-Pacific	2018	<p>Develop an understanding of the rise of industrial economies like Singapore, Malaysia, Thailand and Indonesia.</p> <p>Comprehend of the economies of Australia and New Zealand</p> <p>Ability to know the Regional Economic Groups like ASEAN, ESCAP, APEC and EAS</p>

24	SEAPS-401-C	c) Energy, Environment and Sustainable Development	2018	<p>Develop an understanding of the Types of energy sources in the world and India</p> <p>Learn about environment issues and emerging green technologies</p> <p>Know the need of Renewable Energy, Green Energy, Bio-Diversity and eco systems</p>
25	SEAPS-402-A	a) Post-Cold War World order	2018	<p>Develop an understanding of the Cold War and Non-Aligned Movement.</p> <p>2) Students gain knowledge on Globalization and Multi National Companies.</p> <p>3) Differentiate Regional and Multilateral Cooperation and the roles of ASEAN and SAARC</p>
26	SEAPS-402-B	b) South Pacific Cultures	2018	<p>Students will learn about the definition of culture</p> <p>2. Will be able to learn about different societies in South Pacific</p> <p>➤ 3. Can identify different ethnic minorities in South Pacific</p>

27	SEAPS-402-C	c) Developing Blue Economy	2018	<p>Acquainted with the Blue Economy, Marine Governance and Ocean Technologies.</p> <p>2) Gain knowledge on ports and shipping, oceanic resources and marine bio-technology.</p> <p>3) Develop an understanding on Renewable Ocean Energy and its Importance.</p>
28	SEAPS-402-D	d) History of the USA from 1766-1963	2018	<p>Learn about American war of Independence</p> <p>2. Develop knowledge on the roles of Presidents of the USA</p> <p>3. Learn the causes for the Civil War, Abraham Lincoln and era of American Imperialism.</p>
29	SEAPS-403-A	(a) India-Australia Relations	2018	<ul style="list-style-type: none"> ➤ Learn about Littoral States of Indian Ocean and Complementarities between India-Australia ➤ Ability to analyze Political Issues and security concerns of both nations. ➤ Comprehend on the Post Cold War initiatives, strategic and security concerns

30	SEAPS-403-B	(b) History of Modern Andhra Pradesh 1800-195	2018	<ul style="list-style-type: none"> ➤ Students will learn about different dynasties that ruled Andhra Region ➤ Formation of Andhra in 1953 will be studied ➤ Students will study about Jai Andhra Movement
31	SEAPS-402	6	2018	<ul style="list-style-type: none"> ➤ Develop an understanding of the rise of industrial economies like Singapore, Malaysia, Thailand and Indonesia. ➤ Comprehend of the economies of Australia and New Zealand. ➤ Ability to know the Regional Economic Groups like ASEAN, ESCAP, APEC and EAS.

TOURISM:

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes

1	T 101	Theoretical Concepts of Tourism	2018	<p>Understand the Nature, Meaning and Scope of Tourism.</p> <p>Students understand the different aspects in tourism.</p> <p>Earn knowledge about national and international tourism organisations</p>
2	T 102	Planning and Development of Tourism	2018	<p>Learn about organized planning in the tourism industry.</p> <p>Gain knowledge on the resolutions of state governments towards tourism in their states.</p> <p>Know the significance of planning policies of international institutions</p>
3	T 103	Indian Heritage and Culture	2018	<p>Students will be in a position to distinguish between different art forms in India.</p> <p>Colonial Heritage of India is one of the important aspects in Indian Tourism.Importance of different religions in India and</p>
4	T 104	Art and Architecture of North India	2018	<p>Understand briefly the different art forms in India.</p> <p>Students understand and distinguish different types of architecture.Learn about most famous forts and palaces in India</p>
5	T 105	Cultural Tourism in India	2018	<p>Students gain knowledge on Indian culture</p> <p>Evaluate the cultural resources to utilize as a tourism products. .</p> <p>Interpret the techniques of handicrafts</p>

6	T 106	Human Values and	2018	
7	T. 201	Historical Application Of Tourism In India	2018	<p>Students know historical development of tourism in India</p> <p>2) Categorize important tourism linkages and destinations.</p> <p>3) Gain knowledge on major tourist circuits</p>
8	T 202	Tourism Management	2018	<p>Demonstrate managerial skills and to manage the Tourism environment</p> <p>Apply the marketing skills and understanding demand and supply.</p> <p>Acquire skills of using Human Resources in Tourism Development</p>
9	T 203	World Tourism Geography	2018	<p>Gain knowledge on the influence of geography on Tourism.</p> <p>Examine and learn the use of geographical tools</p> <p>Know the important definitions and destinations</p>
10	T 204	Art and Architecture of South India	2018	<p>Understand briefly the different art forms in India</p> <p>Students understand and distinguish different types of architecture.</p> <p>Learn about most famous forts and palaces in India.</p>

11	T 205	Cultural Tourism in Andhra Pradesh	2018	<p>Understand culture and Cultural impacts of Andhra People</p> <p>Students understand culture and life style of Andhra.</p> <p>Learn about performing arts and cultural contribution of various dynasties</p>
12	T 301	Travel Agency and Tour Operations Management (TMP)	2018	<p>Gain knowledge of history of travel agency, nature, and form of travel.</p> <p>Build an understanding of functions performed by the Travel agency and tour operator.</p> <p>Comprehend the International rules and regulations of travel agencies</p>
13	T 302	Emerging Trends in Tourism (MP)	2018	<p>Students will learn about different types of Tourism.</p> <p>Build an Understanding of socio, cultural and economic impacts of tourism.</p> <p>To learn Tourism related laws, responsibilities and different acts related to tourism.</p>
14	T 303	Airline Ticketing and Information Management (MPJ)	2018	<p>Students know about IATA and its functions</p> <p>Gain knowledge and use of information technology in tourism industry</p> <p>To know about tour office management skills and tour desks</p>

15	T 304 a	Tourism Research Methods (GVKR)	2018	<p>To make the student understand the scope of research in tourism sector.</p> <p>Students learn different techniques used in Research for tourism sector.</p> <p>Gain knowledge in presentation of research findings and prepare projects</p>
16	T 304 b	Transport Management (ALC)	2018	<p>Students will understand the role of Transport in Tourism</p> <p>Gain knowledge on the importance of manpower in Transport Business</p> <p>Comprehend the students how Transport Management is essential in Tourism</p>
17	T 304 c	Communicative English for Tourism and Hospitality	2018	➤

18	T 304 d	Tour Guide	2018	➤
19	T 305 a	Heritage Management	2018	➤
20	T 305 b	Tourism Economics (VRB)	2018	<p>Students learn the concepts of demand and supply in tourism.</p> <p>Assess the impact of tourism on environment, social and political.</p> <p>To evaluate the role of public and private sectors and sources of finances</p>

21	T 401	Tourism Marketing	2018	<p>Students acquire knowledge on the tourism needs and demands.</p> <p>To know different types of marketing strategies related to the tourism industry.</p> <p>Students acquire different types of skills pertaining to tourism sector</p>
22	T 402	Tourism and Hospitality Management	2018	<p>Student will be in a position to distinguish between different types of accommodations in the hotel industry.</p> <p>Will realize the importance of hospitality in the tourism sector.</p> <p>He or she will be familiar with various types of cuisines in the hotel</p>
23	T 403	Environment and Tourism	2018	<p>Learn about the wildlife Sanctuaries</p> <p>Gain knowledge on environment and management of Eco System</p> <p><i>Comprehend the Global climate policies</i></p>
24	T 404 a	Health and Medical Tourism	2018	<p>Develop understanding of medical tourism, its development over ages as an industry</p> <p>Learn the role of government and private sectors in promotion of Medical Tourism</p> <p>Identify various issues related to Medical Tourism and Emerging</p>

25	T 404 b	Dissertation + Viva	2018	➤
26	T 404 c	German Language	2018	➤
27	T 404 d	Hindi Language	2018	➤

28	T 405 a	Adventure Tourism	2018	<p>Explain the status and scope for adventure tourism in India. Learn different types of adventure tourism</p> <p>.Evaluate the role of government and other stakeholders in adventure tourism</p>
29	T 405 b	Event Management	2018	<p>1) Know the types and importance of event management.</p> <p>2) Understand the managerial and operational aspects pertaining to the MICE industry.</p> <p>3) Learn about customer care, marketing equipment and tools</p>

4. Centre for Womens Studies

	Course Code	Name of the Course	Year of introduction	Course Outcomes
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1	SVUWS-105a	Gender, Environment, Climate Change & Livelihood	2018	<ul style="list-style-type: none"> ➤ This course builds theoretical base required for classification Gender Roles and livelihood of rural and tribal women. ➤ Impart skills and knowledge for developing Sustainable Environment and Livelihood Management systems with gender mainstreaming.
2	SVUWS-105b	Gender Society and Power Relations	2018	<ul style="list-style-type: none"> ➤ This course Insights on Gender Disparities within the Family, Economy, Education, Political and Legal Systems, understanding of social dynamics and power relations to perform the society and acquired gender sensitized skills.
3	SVUWS-106a	Human Values And Ethics –I	2018	<ul style="list-style-type: none"> ➤ The course is to enable students to develop amoral values and ethics for holistic approach of human development.
4	SVUWS-106b	Leadership values	2018	<ul style="list-style-type: none"> ➤ This course instill skill and domaine knowledge required for hands-on leadership learning experience focusing on leadership as an outgrowth of universal values that will help as effective and ethical leaders.
5	SVUWS-205a	Capacity building and leadership Training	2018	<ul style="list-style-type: none"> ➤ Enhance Knowledge and skills among students in designing and organization of suitable capacity building programmes and

6	SVUWS-205b	Gender & Media	2018	<ul style="list-style-type: none"> ➤ Students learn to Critical analysis of Gender representation and socio-cultural mechanism on media
7	SVUWS-206a	Human values & Professional Ethics –II	2018	<ul style="list-style-type: none"> ➤ To develop values and professional ethics in an organization and society.
8	SVUWS-206b	Familial values and Ethics	2018	<ul style="list-style-type: none"> ➤ To apply the skills of theory in practice with families and children to understand the family values and ethics
9	SVUWS 301	Gender, Science & Technology	2018	<ul style="list-style-type: none"> ➤ Students acquire skills on Approaches to applying Gender in Science and Technology to create Gender Management System.
10	SVUWS 304d	Women's participation in Agriculture & Allied sectors	2018	<ul style="list-style-type: none"> ➤ To understand the Role of Women in Agriculture and allied fields and Policies and Programmes for Women in Agriculture importance's in our country and to know the possible oppournities to create agri-business.
11	SVUWS 305a	Gender Sensitization & Training	2018	<ul style="list-style-type: none"> ➤ To equip the students on the capacities to raise gender sensitivity to reduce felinity and masculinity and ➤ To important knowledge on the appropriate actions to be taken for sustenance of gender equal society
12	SVUWS 305b	Gender Identity and Leadership	2018	<ul style="list-style-type: none"> ➤ Provides knowledge about social process and cultural understanding. It also develops a clear and precise conceptual clarity on gender and leadership.

14	SVUWS 305c	Women and Governance	2018	<ul style="list-style-type: none"> ➤ To enable the students to understand the Women and Governance in the Indian context
15	SVUWS 404c	Multimedia systems	2018	<ul style="list-style-type: none"> ➤ Hands on experience on Multimedia: media and Data Streams. ➤ To understand Multimedia operating and Communication Systems.
16	SVUWS 404d	Reproductive Health and Family Life Education	2018	<ul style="list-style-type: none"> ➤ Create knowledge about Reproductive Health and Communicable Diseases ➤ Awareness on Reproductive Health Care Services, Policies & Programmes
17	SVUWS 405a	Women & Globalization	2018	<ul style="list-style-type: none"> ➤ To create awareness among the students on the ongoing process of globalization; ➤ To analyze the impact of globalization on feminization of labour force, low wages and Income gender inequalities
18	SVUWS 405b	Technical communication and computer ethics	2018	<ul style="list-style-type: none"> ➤ Establish skills on Technical Writing, Computer Ethics, Hacking and Hacker Ethics computer crimes in gender perspective.
19	SVUWS 405c	Gender & Mass Communication	2018	<ul style="list-style-type: none"> ➤ To provides a clear and precise clarity about gender status in contemporary society by referring the participation of women in mass communication

5. Econometrics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomesv
1	EMT 101	MicroeconomicTheoryI	2018	<ul style="list-style-type: none"> • The microeconomic theory is to analyze how individual decision-makers, both consumers and producers, behave in a variety of economic environments. • The common goal in all of these issues is to identify the incentives of the various participating agents and the trade-offs that they face. • Microeconomics is a branch of economics that studies the behavior of individuals and firms in making decisions regarding the allocation of scarce resources and the interactions among these individuals and firms. • Microeconomics shows conditions under which free markets lead to desirable allocations. • The fundamental concepts of supply and demand, rational choice, efficiency, opportunity costs, incentives, production, profits, competition, monopoly, externalities, and public goods will help you to understand the world around you.

2	EMT 102	Macroeconomic Theory I	2018	<ul style="list-style-type: none"> • Define and explain the process of calculating national income, identify its components, demonstrate circular flow of income, analyse the various income identities with government and international trade, define the concept of green accounting. • Understand Say's law of market, classical theory of employment and Keynes objection to the classical theory, demonstrate the principle of effective demand and income determination. • Explain the meaning of consumption function, relationship between APC and MPC, consumption and income, concept of multiplier and analyse the theories of absolute and relative income hypotheses. • Understand the relationship between investment and savings, demonstrate investment multiplier, and understand the meaning of MEC and MEI. CO5. Illustrate the meaning of interest, analyse the various theories of interest • The goals are supported by objectives such as minimizing unemployment, increasing productivity, controlling inflation, and more. The macro economy of a country is affected by many forces, and as such, economic indicators are invaluable to assessing different aspects of performance.
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3	EMT 103	Mathematical Methods	2018	<ul style="list-style-type: none"> • Formulate mathematical models describing the dynamics of economic systems. Demonstrate the role of quantitative techniques in the field of business/industry, illustrate different types of equations, solve equations and system of equations, understand the concept of sets, illustrate and apply basic set operations. • Explain the rules for calculating derivatives, uses and application in calculating inter-relationship among total, marginal and average cost and revenue, calculate maxima, minima, elasticity, decide the optimal level of production for a firm. • Demonstrate the rules for calculating integration, describe the importance and application of integration in consumers' and producers' surpluses, total revenue and cost. • Illustrate matrix operation, minors, cofactors, use cofactor method to find inverse of a matrix, use Cramer's rule to solve systems of equations. • Students will get to learn applications of mathematical tools to economy.
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4	EMT 104	PracticalII	2018	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 Able to find Inverse of a Matrix, System of Simultaneous Linear Equations and Cramer's Rule method.</p> <p>CO5 Student can identify the relationship between the economic variables and test their significance which is key factor for economic analysis and policy making or business decisions.</p>
5	EMT 105	StatisticalMethods	2018	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis.</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 formulate Statistical Methods describing the dynamics of economic systems such as production function analysis and solve econometric analysis of underlying data use with knowledge advanced econometric tools and techniques can solve easily.</p> <p>CO5 Student can identify the relationship between the economic variables and test their significance which is key factor for economic analysis and policy making or business decisions.</p>
6	EMT 106	HumanValuesandProfessionalEthics-I	2018	
7	EMT 201	MicroeconomicTheoryII	2018	<p>Course Objectives: The microeconomic theory is to analyze how individual decision-makers, both consumers and producers, behave in a variety of economic environments. The factor prices</p>

8	EMT 202	MacroeconomicTheoryII	2018	<p>CO1 The overarching goals of macroeconomics are to maximize the standard of living and achieve stable economic growth</p> <p>CO2 The goals are supported by objectives such as minimizing unemployment, increasing productivity, controlling inflation, and more.</p> <p>CO3 The macro economy of a country is affected by many forces, and as such, economic indicators are invaluable to assessing different aspects of performance.</p> <p>CO4 Meaning and Types of Inflation – Demand-Pull inflation – Cost-Push Inflation – The Phillips curve – The Inflation – Unemployment trade-off.</p> <p>CO5 Objectives of Macroeconomic policies – Objectives of Monetary policy. New-classical and Real Business cycles Theorem – Post-Keynesians - Implications for Stabilization Policies.</p>
9	EMT 203	BasicEconometrics	2018	<p>CO1 Adequate competency in the frontier areas of economic theory and methods.</p> <p>CO2 Formulation and estimation of a multiple regression model.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all models</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Estimation of system of equations, estimation of panel data models, generalized method of moments, discrete response models, censored regression models and estimation of average treatment effects.</p>

10	EMT 204	Practical II	2018	<p>CO1 Students can Identify Inter industrial relationships using Input-output analysis,</p> <p>CO2 analyse maximization of profits and minimization of costs can evaluate using Linear Programming,</p> <p>CO3 Analyse relationship of economic variables using simple and multiple regression models which are covered in basic Econometrics</p> <p>CO4 Able to estimate and interpret linear regression models and be able to distinguish between economic and statistical importance</p> <p>CO5 They should be able to critique reported regression results in applied academic papers and interpret the results for someone who is not trained as an economist.</p>
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11	EMT 205	Mathematical Economics	2018	<p>CO1 Students can deal Mathematical calculation of static optimization, Application of Lagrange's method and also student can evaluate Differential Equations and with Economic Applications.</p> <p>CO2 Able to estimate and interpret Inter industrial relationships using Input-output analysis, also analyse maximization of profits and minimization of costs of the firms using Linear Programming method</p> <p>CO3 Economic Applications of Differential Equations – Dynamic Multiplier – Harrod-Domar Model.</p> <p>CO4 Homogeneous Linear Difference Equations with Constant Coefficients – Particular Solution of Non-homogeneous Linear Equations – Linear First Order and Second Order Difference Equations with constant coefficients – Cobweb Model –Market model with Stocks</p> <p>CO5 Formulation of LPP – Basic and Feasible Solutions – Graphical Solution - Simplex Method – Duality in Linear Programming – Elements of Data envelop Analysis and its Applications.</p>
12	EMT 206	Human Values and Professional Ethics II	2018	

13	EMT 301	<i>Indian Economy</i>	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources. Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, make in India etc</p> <p>CO4 Students will get benefit about various economic issues at local, national and global level.</p> <p>CO5 Grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.</p>
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14	EMT 302	<i>Economics of Insurance</i>	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development seminars, internships, and/or a practicum in insurance and risk management.</p> <p>CO5 Examine the role of public policy including social insurance in personal financial planning and risk management.</p>
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15	EMT 303	<i>Advanced Econometrics</i>	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Concepts of Heteroscedasticity & Multicollinearity. Possible reasons behind the presence of Heteroscedasticity & Multicollinearity. Skill to judge the reliability of estimation in case of violation of basic assumptions for the application of ordinary linear regression method.</p> <p>CO2 Concepts of Autocorrelation reasons behind the presence of Heteroscedasticity & Multicollinearity. Describe the variance/covariance matrix for the regression errors under the assumption that the errors are correlated</p> <p>CO3 Apply modern econometric methods covering time series analysis, financial econometrics, microeconometrics, macroeconometrics and structural econometric modelling;</p> <p>CO4 Interpret and critically evaluate applied economics research literature; demonstrate programming skills and numerical methods; and</p> <p>CO5 Apply methods learned to address policy and business decision questions.</p>
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16	EMT 304	<i>Computer Applications and Data Analysis</i>	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will get basic knowledge of computers i.e., block diagram, evolution of computer, input/output devices, storing information in computer etc.</p> <p>CO2 At the end of this course student will gain Examine spreadsheet concepts and explore the Microsoft Office Excel environment. Import and export data.</p> <p>CO3 Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas. Perform analysis tasks using Data analysis pack</p> <p>CO4 Student gained and evaluate Econometric Methods such as OLS, LPM, Logistic regression analyses and conclude using SPSS Package</p> <p>CO5 Finally, student will be able to write programme for Simple statistical analyse and interpret through R-programming.</p>
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17	EMT 305	<i>Public Finance</i>	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Understand the sources of finance both public and private, demonstrate the role of government to correct market failures and possible advantage of public financing</p> <p>CO2 Attain the advantages and knowledge of public investments and other government expenditures. Understand the causes of growing public expenditures for various programmes and policies within and outside the country.</p> <p>CO3 Understand the possible burden, benefits and distribution of various types of taxes among various classes of people, know the general trend and impact on general welfare and arouse them to suggest good and bad tax system.</p> <p>CO4 Understand the needs of public borrowing from all possible sources to meet necessary public investment/expenditures. Also be alerted to find sources for repayment</p> <p>CO5 Deliver effectively the preparation of budget and how they are passed in the house. Understand the changes in size and flexibility of state and central budget along with the role played by Finance Commission.</p>
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18	EMT 306	<i>Financial Institutions and Markets</i>	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Explain the broad features of Indian financial institutions with its apex banks' objectives and purview. Also understand the instruments to control credit in the country.</p> <p>CO2 Effectively narrate the kinds and components of money with its regulatory system, be aware of the functions, objectives and limitations of commercial banks.</p> <p>CO3 Identify the existence and development of non-banking financial institutions, know the important role of Mutual funds, LIC, investment companies etc., utilize and effectively participate in the development process.</p> <p>CO4 Understand the conditions of financial markets and its impact in the economy</p> <p>CO5 Demonstrate the role and significance of foreign exchange rate and its markets with its impact on various sectors in the economy.</p>
19	EMT 307	<i>Practical III</i>	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Student will gain Examine spreadsheet. Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas.</p> <p>CO2 Perform analysis tasks using Data analysis pack using MS-Excel.</p> <p>CO3 Student gained and evaluate Econometric Methods such as OLS, LPM, Logistic regression analyse and conclude using SPSS Package</p> <p>CO4 Student will able to test of Multicollinearity, Heteroscedasticity and Autocorrelation.</p> <p>CO5 Student will be able to write programme for Simple statistical analyse and interpret through R-programming.</p>

20	EMT 308	IntroductiontoEconometrics	2018	<p>CO1 students will have adequate competency in the frontier areas of economic theory and methods</p> <p>CO2 Use basic econometric estimation techniques such as Ordinary Least Squares to estimate bivariate and multivariate regression models.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all model.</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Students will acquire additional specialization topics are estimation of system of equations, estimation of panel data models, generalized method of moments, discrete response models, censored regression models and estimation of average treatment effects.</p>
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21	EMT 309	Indian Economy	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources. Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, make in India etc</p> <p>CO4 Students will get benefit about various economic issues at local, national and global level.</p> <p>CO5 Grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.</p>
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22	EMT 310	EconomicsofInsurance	2018	<p>CourseOutcomes:Attheendofthecourse,thestudentwillbeableto</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development seminars, internships, and/or a practicums in insurance and risk management.</p> <p>CO5 Examine the role of public policy including social insurance in personal financial planning and risk management.</p>
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23	EMT 401	<i>International Trade and Finance</i>	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Identify the basic difference between inter-regional and international trade, understand how international trade has helped countries to acquire goods at cheaper cost and explain it through the various international trade theories.</p> <p>CO2 Show the benefits of international trade in a way how nations with strong international trade have become prosperous and have the power to control world economy and how global trade can be one of the major contributors of reducing poverty.</p> <p>CO3 Explain how restrictions to international trade would limit a nation in the services and goods produced within its territories and at the same time explain that a rise in international trade is essential for the growth of globalization.</p> <p>CO4 Show the importance of maintaining equilibrium in the balance of payments and suggests suitable measures to correct disequilibrium as well.</p> <p>CO5 Be aware of the changes in the composition as well as direction of foreign trade after international trade and know the causes and effects of deficits in the balance of payments, measures adopted to correct the deficits and identify the need for having trade reforms.</p>
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24	EMT 402	<i>Environmental Economics</i>	2018	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Realize the importance and influence of environment on the economy including the quality of manpower. Arouse their feelings to make cleaner environment so as to achieve harmonious development.</p> <p>CO2 Understand that environmental problem is not the problem of a single country or region but a global problem/issue. Hence, policy formulation may be for all countries.</p> <p>CO3 Demonstrate the scientific management of waste materials; realize the role and importance of individuals to keep the environment clean.</p> <p>CO4 Understand the causes and victims of environmental pollution like poverty, population explosion, and over-use of resources, careless or unscientific dump/management of wastes.</p> <p>CO5 Suggest appropriate measures to correct environmental degradation, aware of those ingredients such as healthy climate, quality of human beings, domestic and other natural habitats and biodiversity levels, productivity and productions, sustainability, etc are all influenced by environment.</p>
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8. Economics

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ECO-101 & 201	Micro Economics Analysis – I & II	2018	<ol style="list-style-type: none"> 1. Graduate Consulting Analyst. Graduate Recruitment Bureau. 2. Economic Consultant (Public Policy). 3. NERA Internship -Industry Research Analyst. Research

				Fellow. 4. Graduate Economic Consulting Internship, Economist, Customer Experience Strategy.
2	ECO-102 & 202	Macro Economics Analysis – I & II	2018	1. Work for a central bank of financial institutions. 2. Work as a consultants. 3. work in banking sector.
3	ECO-103&203	Public economics &Federal Finance	2018	1. Assistant commercial Tax Officers. 2. Industrial finance officers. 3. Bill collectors.
4	ECO-104&204	Mathematical Methods in Economics – 1and Statistical Methods in Economics	2018	1. Assistant Statistical officers. 2. Bossiness firm consultant. 3. Market research Analyst. 4. Financial analyst. 5. Investment manager. 6. International trade specialist.
5	ECO 105(a)	Fundamentals of Computer	2018	1. Digital Assistants. 2. Office Computer operators.
6.	ECO 105(b)	Urban Economics	2018	1. Senior urban economist. 2. International urban Economist. 3. Senior program Research analyst. 4. Urban environmental impact officer.
7.	ECO 105(c)	Welfare Economics	2018	1. Policy maker. 2. Administrator. 3. Welfare officer in Sachivalyam. 4. Admin in Sachivalayam.
8.	ECO 106(a)	Economics of Environment	2018	1. Environmental pollution officer. 2. Environmental consultants. 3. Environmental pollution planning and consultants. 4. Environmental conservation / Advocacy.
9.	ECO 106(b)	Demography	2018	1. National Sample Survey officers. 2. Census Survey Officers. 3. Chief planning officers.
10.	ECO 107	Human Values and Professional	2018	1. The student will be enriched with several aspects

		Ethics -I		<p>pertaining to Human values and performing of Professional Ethics in day today life.</p> <ol style="list-style-type: none"> 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
11	ECO 205(a)	International Trade: Theory and Policy	2018	<ol style="list-style-type: none"> 1. International trading officers. 2. Export and import Officers. 3. Shares consultants. 4. Commercial desk manager. 5. Global trade Advisory.
12	ECO 207	Human Values and Professional Ethics -II	2018	<ol style="list-style-type: none"> 1. Student will know the values of ethics in various fields including medical, social and business ethics. 2. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 3. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
17	ECO 301	Economics of Growth and Development	2018	<ol style="list-style-type: none"> 1. Project Coordinator. 2. Recreation manager. 3. Programme Director. 4. Social and community manager.
18	ECO 302	Indian Economy	2018	<ol style="list-style-type: none"> 1. NSSO. 2. Economic Survey directors.
19	ECO 304 (a)	International Finance	2018	<ol style="list-style-type: none"> 1. Financial Advisors. 2. Financial officers.
23	ECO 304	Communication and Soft Skills	2018	<ol style="list-style-type: none"> 1. Skill development coordinators. 2. Public relation officers. 3. Marketing and Advertising. 4. Media.

				5. Meeting and event planning.
26	ECO 401	Rural Development	2018	1. MGNREGA Programme officers. 2. District Coordinators. 3. Institutional building officers.
27	ECO 402	Financial Institutions and Markets	2018	1. Corporate finance. 2. Financial planning officers.
28	ECO 403 (a)	India's Economic Reforms	2018	1. Planning & Development Officers
29	ECO 404 (c)	Entrepreneurship and Skill Development	2018	1. Business consultant. 2. Research and development. 3. Recruiter. 4. Sales managers.
30	ECO 404 (d)	Labour Economics	2018	1. Labour officers. 2. Labour relations officers. 3. Labour relations assistant. 4. Construction estimators
31	ECO 305 (c)	Economics of Insurance	2018	1. Insurance Agents. 2. Loan processor. 3. Loss control officers. 4. Risk managers.
33	ECO 405 (a)	Human Resource Development	2018	1. Human resource recruiter. 2. Performance management and development. 3. Employees training officers. 4. Organizational development officers.

10. English

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
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1)	101:	Poetry-I	2018	<ul style="list-style-type: none"> • An understanding of the evolution of English poetry across ages. • May inspire poetic creativity
2)	102:	Drama-I	2018	<ol style="list-style-type: none"> 1. Perceive the nuances of performance 2. Recognize the transformation of human experiences into dramatic experiences.
3)		:Fiction-I	2018	<ol style="list-style-type: none"> 1. Aesthetic and literary merits of the novel 2. The conditions of the age and the influence
4)	104	:Prose-I	2018	<ol style="list-style-type: none"> 1. Understand the genre of essay 2. Imbibe the deeper human values implied in the essay.
5)	106:	Human Values and Professional Ethics-I	2018	<ol style="list-style-type: none"> 1. Realize the necessity of practicing Human values and Ethics in all walks of life including the profession they opt for 2. Understand Bhagvad Gita as a guide for modern lifestyle

6)	201	:Poetry-II	2018	<p>Sensitizes the students on the classical and contemporary poetic ethos</p> <p>Raises student awareness on movements like Modernism, War Poetry, Women's poetry, Symbolism etc,</p>
7)	202	:Drama-II	2018	
8)	203	:Fiction-II	2018	<ol style="list-style-type: none"> 1. The great works of major novelist of modern age 2. The ability to understand the technique of the Novel
9)	204	:Prose-II	2018	<p>After the completion of the course the students are able to</p> <ol style="list-style-type: none"> 1. Know the working mechanism of Feminism and socialism 2. Know the mind and strategies of Victorian essayists 3. Know the importance of culture in the lives of Victorian people <p>Know the importance of being human in their dealings with the fellow beings</p>
10)	205:	English Language Teaching	2018	<ol style="list-style-type: none"> 1. Understand the importance of language lab, teaching material and audio-visual aids in the learning and teaching of English. 2. Know to test and testing components of language tests examinations and evaluation procedures

11)	301	: Indian English Literature-I	2018	<ol style="list-style-type: none"> 1. Understand the Indian English writings and movements associated with it in India 2. Understand the merits of Indian English writings and drawbacks if any
12)	302:	American Literature-I	2018	<ol style="list-style-type: none"> 1. An idea of English literature in America 2. Familiarity with the literary movements 3. Knowledge about concepts like Puritanism, transcendentalism, symbolism, impressionism etc
13)	303:	Literary Criticism-I	2018	<p>Equips the student with the evolution of English Literary Criticism from Aristotle to early twentieth century</p> <p>Helps students map the genealogy of Western canonical critical texts</p>
14)	304 (A) 304(B): 304 (C): 305 (D):	:Comparative Literature Short Story Women's Writings Indian Literature in English	2018	<ol style="list-style-type: none"> 1. Understand national and world literatures and the need of comparative studies in the global world. 2. Understand the ways of comparative analysis <p>OUT COMES:</p> <p>Perceives creativity as a tool of empowerment and unity amongst women.</p> <p>Understand gendered spaces in creativity and the genealogy of women's writings like Indian, African American, French etc.</p>

15)	305 (A):	Communicative English	2018	<p>Understand the significance and importance of Communication in English in the present day world</p> <ol style="list-style-type: none"> 1. Understand communication process, the different types and barriers of communication
16)	305(B):	English for Media	2018	<ol style="list-style-type: none"> 1. Understand the use of language in different situations in writing for the media 2. Learn the oral skills necessary for media like interview skills
17)	305(C):	3An Introductory Course to Literature	2018	<ol style="list-style-type: none"> 3. Understand the use of language in different situations in writing for the media 4. Learn the oral skills necessary for media like interview skills
18)	401:	Indian English Literature-II	2018	<ol style="list-style-type: none"> 1. Understand the Indian English writings and movements associated with it in India 2. Understand the poetic features of Indian English poetry

19)	404(A): 404(B): 404(C): 404(D):	Translation: Theory and Practice Subaltern Studies Post-Colonial Literatures World Classics in English Translations	2018	1. Know the concepts of dalitism, feminism, marginalism and Subaltern aspects with relevant theories 2. Appreciate and understand the struggles and sorrows of subalterns
20)	405(A): 405(B): 405(C):	Soft Skills Indian Literature in English Translation Contemporary Translation Studies	2018	1. Will learn about morals and responsibilities 2. Learn to acquire the enduring values embedded in the great literary works of our writers

11. Linguistics

S.No	Course Code	Name of the course	Year of introduction	Course outcomes
1	LING 101	Language and Linguistics	2018	Understand basic concepts of language. 2. Analyze structure of language and grammatical analysis. s3. Understand Linguistics and other fields.

2	LING 102	Phonetics	2018	<ul style="list-style-type: none"> 1. Understand the process of Communication and speech production, Classification and description of speech sounds. 2. Analyze production of speech, Secondary and double Articulations and suprasegmental features 3. Understand principles and types of Transcription
3	LING 103	Phonology	2018	<ul style="list-style-type: none"> 1. Understand concept of Phoneme, Principals of Phonemic analysis and discovery procedures. 2. Analyze phonemes, Phonological systems, procedures of phonemics and basic units of Phonology. 3. Understand Generative Phonology
4	LING 104	Morphology	2018	<ul style="list-style-type: none"> 1. Analyze Morpheme, classification and types of morphemes and grammatical categories 2. Analyze derivation, inflection, different models of grammatical description and morpho phonemics 3. Express Intermediate constituents, types of constructions and Idioms
5	LING 105	Syntax	2018	<ul style="list-style-type: none"> 1. Understand assumptions about language, components of grammar and sentence constituents

				<ol style="list-style-type: none"> 2. Analyze Phase structure rules, X-bar Notation and grammatical transformations 3. Understand categorical, sub-categorical information, selectional restrictions and syntactic structures of Indian Languages
6	LING 106	Human Values and Professional Ethics-I	2018	<p>Understand Nature of Ethics, Professional Ethics, Nature of Values and influence on Individual and Society</p> <ol style="list-style-type: none"> 2. Understand Bhagavad Gita, four noble duties and values of various religions 3. Understand crime and Theories of Punishment
7	LING 201	Semantics	2018	<ol style="list-style-type: none"> . Understand Nature and Scope of Semantics and types of meaning 2. Analyze lexical structure, sentence structure and meaning 3. Understand Lexical context of Meaning and Change of Meaning
8	LING 202	Historical Linguistics	2018	<p>Understand the major breakthroughs in historical Linguistics</p> <ol style="list-style-type: none"> 2. Understand sound, Linguistic change, Linguistic borrowing, internal reconstruction, glottochronology and practices of comparative method. 3. Solve problems and analysis in Historical Linguistics
9	LING 203	Dialectology	2018	<ol style="list-style-type: none"> . Understand nature and Scope of Dialectology, purpose of Dialectology and Dialectal studies 2. Analyze types of dialects and variability

				3. Understand dialect survey methodology and its approaches
10	Coruse:204	Field Linguistics	2018	. Understand scope and purpose of field linguistics and problems of investigating non literary language Analyze the techniques and methods of data elicitation and collection of Linguistic data 3. Understand data processing and language documentation
11	LING 205	Language Families of India and Comparative Dravidian (Phonology)	2018	Understand language families of India, Dravidian Language Family and history and sources of each Dravidian Language. 2. Analyze vocalic, consonant and Sandhi systems, and reconstruction of Dravidian. 3. Understand sub grouping and relation with other language families
12	LING 206	Human Values and Professional Ethics – II	2018	Understand value education and human values 2. Understand the effectiveness and capability of Medical and Business Ethics 3. Understand environmental and social ethics
13	LING 301	Sociolinguistics	2018	Analyze language and society, Linguistic variability and language varieties 2. Analyze Sociology of language planning and Language and Social identity

				3. Understand Sociolinguistic Methodology and language and power
14	LING 302	Language Contact	2018	<p>Analyze speech as social interaction and language contact and Interference</p> <p>2. Analyze Indian language contact situation and effects of language contact</p> <p>3. Understand Language contact and change and linguistic borrowing</p>
15	LING 303	Communication Disorders and Speech Pathology	2018	<p>Understand disordered communication, language and the brain</p> <p>2. Understand articulation, language and hearing disorders and most communication disorders</p> <p>3. <u>Understand</u> speech pathology</p>
16	LING 304A	Psycholinguistics	2018	<p>. Understand Introduction and an overview of Psycholinguistics and Acquisition of language</p> <p>2. Analyze speech production, perception, and comprehension.</p> <p>3. Understand lexical processing</p>
17	LING 304B	Communication Technology	2018	<p>. Analyze communication theory and Linguistic communication</p> <p>2. Understand Artificial Intelligence, Machine Translation and Micro planner artificial languages</p> <p>3. Understand mobiles changes the society</p>

18	LING 305B	Bilingualism	2018	<p>1. Understand speech as social interaction, theory of bilingualism and LWC.</p> <p>2. Analyze types of bilingualism and measurement of bilingualism.</p> <p>3. Understand Indian bilingualism</p>
19	LING 401	Language Acquisition and Child Language Development	2018	<p>Analyze language acquisition device and stages of language acquisition</p> <p>2. Understand continuity and discontinuity approaches and acquisition power</p> <p>3. Analyze research view of language acquisition</p>
20	LING 402	Natural Language Processing	2018	<p>Understand nature and scope and importance of NLP</p> <p>2. Analyze Mathematical Foundations, essential information theory and Entropy</p> <p>3. Analyze Tagging, Taggers, probabilistic parsing and clustering</p>
21	LING 403	Language Universals and Linguistic Typology	2018	<p>1. Analyze language universals and its role of universals in linguistic theory.</p> <p>2. Understand nature and scope of linguistic typology and linguistic typology as a principles of classification.</p> <p>3. Analyze language families of South Asia, South Asia as a Linguistic area and selected areal features of South Indian languages</p>

22	LING 404A	Lexicography	2018	<p>Understand lexicology and lexicography , notation and format, planning and organization</p> <p>2. Analyze types, number and size of dictionaries and dictionary making</p> <p>3. Understand bilingual dictionaries and practice .</p>
23			2018	
23	LING 404B	Language Teaching	2018	<p>Understand nature and scope of language and role language in language teaching.</p> <p>2. Analyze language acquisition and second language learning and cognitive models of language. learning/teaching</p> <p>3. Understand teaching aids, remedial teaching material and computer aided language teaching</p>
25	LING 405A	Branches of Linguistics	2018	<p>Understand nature and scope of linguistic, language and linguistics and phonetics .</p> <p>2. Understand Phonology, Morphology, Syntax, and semantics.</p> <p>3. Understand types of Interdisciplinary Linguistics and Branches of Applied Linguistics</p>

12. Hindi

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1	101	Sahitya ka Itihas	2018	<ol style="list-style-type: none"> 1. The tradition of writing history of Hindi literature along with determining the time division of Hindi literature will get the knowledge of the background of the particular period of literature. 2. The origin and traditional development of the Bhakti literature and its trends and movements of particular period. 3. The development of ancient literary traditions in medieval poetry in the level of language, expressions and human kindness. 4. The form of devotional literature and achievement of the writers and philosophers in the Bhakti movements at national level.
2	102	Pracheen Evam Madhya Kaleen Kavya	2018	<ol style="list-style-type: none"> 1. Student will get information about ancient literature with especial study of Chandbardai, Vidyapati and Ameer Khusro. 2. Student will get the knowledge of the poetry of Kabeer, Tulasi, Jaysi and Surdash in medieval Hindi literature under the background of Bhakti movement. 3. Student will get the knowledge of the poetry of Bihari and Ghananand in Post medieval Hindi literature. 4. Overall the student will get knowledge of ancient and medieval literature in the practical study with their social and philosophical era.
3	103	Aadunik Kavita	2018	<ol style="list-style-type: none"> 1. Student will know the reflexion of independent movement and renaissance of Indian society in modern poetry. 2. Student will be able to get knowledge of their characteristics by knowing the

				<p>essence of the poems of pre independent poets.</p> <p>3. Student will know the subject, theme, characters, literary forms along with the development of Khari boli as the language of poetry.</p> <p>4. Knowing the movement of romanticism in Hindi literarture, theme of the poetry, love of the nature, feeling of the mankind and society in their poems.</p>
4	104	Samkaleen Kavitha	2018	<p>1. Knowledge of the poems of progressive, experimental, new and contemporary trends of poetry in Hindi.</p> <p>2. Student will get the meaning of the poems of different poets and their poetry, especial context to modern period.</p> <p>3. Student will get the knowledge of new trends of Hindi poems and its issues express by the poets in different manner to understand their present time.</p> <p>4. Student will understand the contemporary poems, its subjects, characters, ideology, their activities, reflections and reactions.</p>
5	105	(A) Samsamyik Kavita	2018	<p>1. Knowledge of the poems of contemporary trends-progressive, experimental, new and contemporary trends of poetry in Hindi.</p> <p>2. Student will get the meaning of the poems of different poets and their poetry, especial context to contemporary period.</p> <p>3. Student will get the knowledge of new trends of Hindi poems and its issues express by Femanist, Dalit and Tribble poets in different manner to understand their present time.</p>

				4. Student will understand the contemporary poems, its subjects, characters, ideology, their activities, reflections and reactions.
6	105	(B) Sahityik Andolan	2018	<p>1. Student will get knowledge of Bhakti movement of medieval period in arts, culture and literature.</p> <p>2. Student will understand independent, romantic movement and its reflection in literature.</p> <p>3. Student will be able to get knowledge of progressive and janvadi movement in Hindi literature.</p> <p>4. Student will be get knowledge of Dalit, Tribal and Feminist movement in Indian society for democratic right to reformation and get equality in Indian society.</p>
7	105	(C) Sahitya Ki Vaichariki	2018	<p>1. Student will know the litrary traditions and modernity, renecienss and indipendent movement along with philosophy in Hindi literature.,</p> <p>2. Renecienss in Indian society especial reference to Hindi speaking states and development of khariboli in Bhartenduyuga and Divediyuga.</p> <p>3. Knowledge of various theories to understand the medievality and modernity, critical theory of history of literature and knowledge of historical materialistic development of philosophy.</p> <p>4. Student will get knowledge of organic evolutional philosophy with different ideologies to understand constitutional rights, democracy, socilism, Gandhism</p>

				Ambekarism and feminism in Hindi literature.
8	106	(A) BhashaVignan aur Hindi Bhasha	2018	<p>1. They will acquire the knowledge of definitions, types, divisions and braches of linguistics; understand the history of Indo-Aryan languages with origin and development of Hindi language.</p> <p>2. They know the background of development of linguistics and languages-like sociological, psychological, historical, cultural and ideological along with classification of Hindi sounds and knowledge of Hindi vocabulary.</p> <p>3. They will know the importance of language as communication source; understand the meanings, form and syntax, development of Hindi Pronouns and Devanagari script.</p> <p>4. They will understand the meaning of phonetics, directions of sound, nature of morphology, phonology and philosophy of language.</p>
9	106	(B) Patrakarita aur Jansanchar Madhyayam	2018	<p>1. They will get knowledge of the beginning of journalism and cultural development of Hindi journalism along with nature of mass media and the development of electronic media.</p> <p>2. Student will get the knowledge of independent journalism, genres of writing, concept of news and telecommunication, revolution of mechanical communication.</p> <p>3. They will know the general principles of editing, writing skills of journalistm, fundamental rights and knowledge of electronic</p>

				<p>media.</p> <p>4. They will understand the working methods of mass media, development and importance of internet in world media in present scenario.</p>
10	107	Human values and Professional Ethics-I	2018	<p>1. Student will get knowledge nature of ethics and nature of values.</p> <p>2. Student gaining knowledge of the ahimsa, satya, brahamacharya.</p> <p>3. Student will get knowledge about Bhagvad Gita and Buddhism.</p> <p>4. Gaining knowledge of the crime and theories of punishment.</p>
11	201	Adhunik Sahitya Ka Itihas	2018	<p>1. There will get knowledge of various conditions of independent and renaissance era and the development of Hindi romanticism.</p> <p>2. Student will get knowledge of various trends of romanticism, prograssivism and post colonial development of Hindi prose and its trends.</p> <p>3. Student will get knowledge of pre and post independent trends of poetry and prose like novel, stories, dramas, one act plays, essays and criticism in modern Hindi literature.</p> <p>4. Student will get knowledge with the development of traditions in modern era and their atmosphere, time, condition and directions in Hindi literature.</p>
12	202	Katha Sahitya	2018	<p>1. Student will be able to understand the Indian society by reading the major novel of Hindi.</p> <p>2. Student will be able to understand the various</p>

				<p>dimensions of human life depicted in the short stories of Hindi.</p> <p>3. Students will be able to know the socio-political, cultural problems and goodness by reading the characters depicted in Hindi short stories.</p> <p>4. Knowledge of socio-historical political background by reading the major characters of novels and short stories in Hindi.</p>
13	203	Natya Sahitya	2018	<p>1. Student will be able to understand the Indian society by reading the major play of Hindi.</p> <p>2. Student will be able to understand the various dimensions of human life depicted in the one act play of Hindi.</p> <p>3. Students will be able to know the socio-political, cultural problems and goodness by reading the characters depicted in Hindi one-act play.</p> <p>4. Knowledge of socio-historical political background by reading the major characters of drama and one act play in Hindi.</p>
14	204	Aalochana Sahitya	2018	<p>1. Knowledge of criticism of Hindi, its traditional base of development.</p> <p>2. Knowledge of criticism, its trends, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of criticism of Hindi writers, their trends, philosophical, critical and theoretical development in practical criticism and its values implemented by different critics.</p> <p>4. Importance of major critical trends and their</p>

				critics, writing of criticism and their contribution in development of Hindi criticism.
15	205	(A) Gadhya Sahitya	2018	<ol style="list-style-type: none"> 1. Knowledge of essays, autobiography of Hindi and its traditional base of development. 2. Knowledge of essays, autobiography and its trends, philosophical background, ideological development and historical process. 3. Knowledge of essays, autobiography of Hindi writers and their trends, philosophical, theoretical development of essays, autobiography and its values implemented by different writers. 4. Importance of essays, major autobiography, trends and contribution of their writers in development of Hindi essays and autobiography.
16	205	(B) Anya Gadhya Sahitya	2018	<ol style="list-style-type: none"> 1. Knowledge of Hindi prose and its traditional base of development. 2. Importance of prose, its trend, philosophical background, ideological development and historical process. 3. Knowledge of Hindi prose writers, their trends, philosophical and theoretical development of prose and its values implemented by different writers. 4. Importance of major prose trends, their writers, writing of prose and their contribution in development of Hindi prose.
17	205	(C) Andhra ka Hindi Sahitya	2018	<ol style="list-style-type: none"> 1. The tradition of writing Hindi literature by Hindi writers of Andhra along with determining the time division of Hindi literature and background of the periodical

				<p>literature.</p> <p>2. The origin and traditional development of Hindi literature by Hindi writers of Andhra and its trends.</p> <p>3. The development of Hindi literature written by Hindi writers of Andhra, literary traditions in poetry and prose, development of Hindi language, expressions and human kindness by their writing in Hindi.</p> <p>4. The form and achievement of the writings, philosophical, socialological and pshycological background of their literature and contribution in national level.</p>
18	206	(A) Proyajan Mulak Hindi aur Rajbhasha	2018	<p>1. Knowledge of the various trends of Functional Hindi, Rajbhasha Hindi and its constitutional importance.</p> <p>2. Knowledge of key elements of Functional Hindi and correspondence language of central and state government official work.</p> <p>3. Student will get knowledge of correspondence and its types, official mailing, drafting, noting, corresponding types and its various forms in Functional Hindi.</p> <p>4. Student will get knowledge of official language Hindi, personal administrative, and finance and public relations management in Hindi language, utility of Hindi language in official level, letter writing and using of technical vocabulary.</p>
19	206	(B) Anuvad ke Sidhanth aur Prayog	2018	<p>1. Student will get to know of the form, process and methods of translation.</p> <p>2. Student will gain the knowledge of types of</p>

				<p>translation as well as problems of translation.</p> <p>3. Student will acquire the knowledge of translation tools and various branches of translation.</p> <p>4. Student will know the principle of construction, nature and importance of translation in practical.</p>
20	207	Human Values and Professional Ethics-II	2018	<p>1. Student will get knowledge of value education and medical ethics.</p> <p>2. Student will get knowledge of the business and environment ethics.</p> <p>3. Gaining knowledge of the social ethics.</p>
21	301	Bhartiya Kavya Shastra Ki Parampara	2018	<p>1. Knowledge of the Achary tradition of Sanskrit poetics and the main principles of poetry soul.</p> <p>2. Student will be familiar with the poetic theory of Sanskrit, Pali, Prakrit, Apabramsha and Hindi with their ideological trends of modern literary personalities.</p> <p>3. Knowledge of ideological thinking of poetry, as principals of poetics in ancient, medieval and modern period of post independence era.</p> <p>4. Knowledge of writings of poetics by Acharyas, poets in ancient and medieval period.</p>
22	302	Hindi Kavya Shastra Ka Vikash	2018	<p>1. Student will get knowledge of thinking of modern writers, about the creativity, its aspects, responsibilities of writers, values of writing.</p> <p>2. Student will known the contribution of writing</p>

				<p>and justification of creativities etc., by development of theoretical criticism in the base of modern ideological and philosophical.</p> <p>3. Student will get knowledge of poetic developed by great Acharyas of Hindi by their writings and ideological conceptual development of modern poetics.</p> <p>4. Student will be able to know the poetic development of pre independent and post colonial period ie romantic poets, thinkers, prograssive writers, contemporary poets and literary personalities.</p>
23	303	(A) Dalit Sahitya	2018	<p>1. Student will get to know the concept of dalit literature and literary movements, with philosophical base and its consciousness.</p> <p>2. Student will get knowledge with the characteristics of dalit literature, ideological strength and philosophical power.</p> <p>3. Student will get knowledge of traditional concept of dalit literature and the problems writing its own history.</p> <p>4. Student will get knowledge of dalit literature in different form, its writers and literary trends like novel, short stories drama, one act play and autobiography etc.</p>
24	303	(B) Adivasi Sahitya	2018	<p>1. Student will get knowledge with the concept of tribble literature and literary movements, philosophical base of tribble literature and its consciousness.</p> <p>2. Student will get knowledge with the characteristics of tribble literature i.e ideological strength and philosophical power.</p>

				<p>3. Student will get knowledge of traditional concept of tribble literature and the problems writing its own history.</p> <p>4. Student will get knowledge of tribble literature in different form, its writers and literary trends like novel, short stories drama, one act play and autobiography etc.</p>
25	303	(C) Narivadi Sahitya	2018	<p>1. Student will get the knowledge of nature of feminist thoughts and writings in Hindi.</p> <p>2. Student will get the knowledge of the various dimensions of feminist thoughts in Hindi.</p> <p>3. Student will get the knowledge of the position and direction of female personalities.</p> <p>4. Student will get an opportunity to understand the literature like poetry, prose, short stories, novels and autobiography of feminist writers.</p>
26	303	(D) Pravasi Sahitya	2018	<p>1. Student will get the knowledge of nature of NRI thoughts and writing skill in Hindi</p> <p>2. Student will get the knowledge of the various dimensions of NRI thought in Hindi.</p> <p>3. Student will get the knowledge of the position and direction of NRI personalities.</p> <p>4. Student will get an opportunity to understand the literature like poetry, prose, short stories, novels and autobiography of NRI writings in Hindi.</p>
27	304	Bhash Shikshan ke Sidhanta aur Proyog	2018	<p>1. Student will get the knowledge of forms, process and methods of language teaching.</p>

				<p>2. Student will gain the knowledge of types of language teaching as well as problems of the same.</p> <p>3. Student will acquire the knowledge of language teaching, tools and various branches of language teaching.</p> <p>4. Student will know the principle of construction, nature and importance of language teaching in practical.</p>
28	305	(A) Vyavaharik Hindi Vyakaram	2018	<p>1. Student will get the knowledge of nature and word wealth of Hindi language.</p> <p>2. Student will get the knowledge of the Devanagari scriupt, sound, vowels and consonants.</p> <p>3. Student will gain knowledge of the Hindi sentence, gender, words, factor and meaning of Hindi tenses.</p>
29	305	(B) Hindi Sahitya Ke Nirmatha	2018	<p>1. Student will get the knowledge of Ameer Khusro, Vidhayapati, Kabir, and Jayasi.</p> <p>2. Student will learn about the medieval poets- Sur, Tulsi, Meera, Raskhan, Rahim, Bihari and importance of their poetries.</p> <p>3. Student will be able to get the knowledge of ancient and medieval poets and poetry, especial reference to Bhakti movement.</p> <p>4. Student will be able to get information regarding literary trends, developed in pre modern period.</p>
30	401	Bharatiya Tulnatmak Sahitya	2018	<p>1. Student will get information about the comparative Indian literature, its concept and form of Indian literature and various stages of development.</p> <p>2. Student will able to understand the problem of</p>

				<p>writing, devotional consciousness of comparative Indian literature with cultural features and influencing thoughts.</p> <p>3. Knowledge of national independence movements, renaissance, romanticism, realism, progressivism and post colonial realistic consciousness reflected in comparative Indian literature.</p> <p>4. In comparative Indian literature, the knowledge of democratic values, subaltern studies with their philosophy, movement of social reformation and identity in literature.</p>	
31	402	Paschatya Shashtra	Samiksha	2018	<p>1. Student will get the knowledge of Plato's pre period and introduction to Greek thinkers.</p> <p>2. Student will get the knowledge of western criticism from Plato to post modernist period.</p> <p>3. Student will get an introduction to all types of modern literary critical theories and thinkers.</p> <p>4. Student will get the knowledge of historical, philosophical development of western criticism by the different thinkers of various fields of knowledge and disciplines.</p>
32	403	(A) Anudit Sahitya	Bhartiya	2018	<p>1. Student will get the information about translated Indian literature, its concept, form of Indian literature and various stages of development.</p> <p>2. Student will be able to understand the problem of writing, devotional consciousness of translated Indian literature with</p>

				<p>cultural features and influencing thoughts.</p> <p>3. Knowledge of national independent movements, renaissance, romanticism, realism, progressivism and post colonial realistic consciousness reflected in translated Indian literature.</p> <p>4. In translated Indian literature the knowledge of democratic values, subaltern studies, their philosophy, movement for social reformation and identity in literature.</p>
33	403	(B) Asmitamulak Sahitya Vimarsha	2018	<p>1. Knowledge of contemporary criticism of dalit, femanist and tribale literary trends.</p> <p>2. Knowledge of contemporary criticism, its tread, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of contemporary criticism of Hindi writers, their trends, philosophical and critical theoretical development, practical criticism and its values implemented by different critics.</p> <p>4. Knowledge of major critical trends, their critics, writing of criticism and their contribution in development of contemporary criticism.</p> <p>1. Knowledge of contemporary criticism of dalit, femanist and tribale literary trends.</p> <p>2. Knowledge of contemporary criticism, its tread, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of contemporary criticism of Hindi writers, their trends, philosophical</p>

				and critical theoretical development, practical criticism and its values implemented by different critics. 4. Knowledge of major critical trends, their critics, writing of criticism and their contribution in development of contemporary criticism.
34	403	(C) Sahitya ka Tulanathmak Adhyayan	2018	1. Student will get the knowledge of study of comparative literature with different methods, nature and problem of comparative literature and studies. 2. Student will be able to know the study of comparative literature, research work and the role of translation etc. 3. Student will gain the knowledge of comparative study of Hindi-Telugu literature. 4. Student will get the knowledge of Hindi and Telugu literary trends and types of literature like novel, short stories, dramas, essays and subaltern studies of literature.
35	403	(D) Anusandhan Ke Siddhanth aur Dristiya	2018	1. Student will get the knowledge of nature, directions, types and methods of research like sociological, regional, textual, linguistic, poetics, comparative and psychological. 2. Student will know the methods of selecting topic, collection of material, preparing of notes, writing and arrangement of thesis. 3. Student will get the knowledge of interview, preparing of short notes, using of library, methods of preparing the notes, modification of thesis, editing, presenting, and writing of conclusion.

				4. Student will be able to know the using of critical theories in research of literature, logistical, linguist problems of research and searching the solutions in research.
36	404	Antar Jananushasnatmak Drushtiya aur Pravidhiya	2018	<ol style="list-style-type: none"> 1. Student will know the poetics, spiritual, mythological, materialist, realist, romantics and views of study of literature. 2. Student will be able to get Knowledge of sociological, historical, aesthetical and psychological vision of literature. 3. Students will know about the new critical, modernist and post modernist, structural and post structural view of literature. 4. Student will understand the linguistics, stylistics, comparative, democratic, Ambedkarist, feministic, colonial and post colonial, Gandhian and humanitarian view of literature.
37	405	(A) Manak Hindi Aur Devnagari Lipi	2018	<ol style="list-style-type: none"> 1. Student will get the knowledge of Hindi forms, designs, vocabulary and sound composition and spelling problem. 2. Student will get the knowledge of formation of terminology, to know the development and use of Devnagari script in practice. 3. Student will know about the standard of Hindi, relation with grammar, use of Hindi language in oral and writing both levels.
38	405	(B) Adhunik Hindi Sahitya Ke Nirmata	2018	<ol style="list-style-type: none"> 1. Student will get the knowledge of the writer of modern Hindi. 2. Student will get the knowledge of the Hindi writers and their writings. 3. Student will be able to know about different trends of literature with writers.

13. History

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	HST 101	History of India Up to 650 A D	2018	<ul style="list-style-type: none"> ➤ Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto 650 C.E. ➤ Student will also be well versed with different analytical approaches and models of interpretation
2	HST 102	History of Indian Polity and Economy, 1206-1757	2018	<ul style="list-style-type: none"> ➤ Students can familiarize in understanding the continuity with changes in all spheres of history, polity and economy under the Delhi sultanates. ➤ Students can understand thoroughly the Mughal conquest of India, their rule, polity and legacy.
3	HST 103	History of Modern India, 1757 – 1947	2018	<ul style="list-style-type: none"> ➤ Student can gain knowledge on the English East India company rule and their reforms.
4	HST 104	History of Modern World, 1900-1945	2018	<ul style="list-style-type: none"> ➤ Student can gain the knowledge on the history and consequences of the World between two World Wars pertaining to League of Nations, Great Depression, Nazism, and Fascism. ➤ Students will understand International Relations during 1919-39. ➤ Students can understand thoroughly about the Second World War and its impact.
5	HST 105 (A)	History of Andhra upto 1336 A D	2018	<ul style="list-style-type: none"> ➤ The study of comprehensive history of the

				<p>country is incomplete without the study of regional history.</p> <ul style="list-style-type: none"> ➤ Regional history is becoming more and more popular, for it has inherit potential of taping varied kinds of sources for understanding the divergent aspects of local heritage and culture. ➤ The students can develop thorough understanding on Ancient Andhra history and culture.
6.	HST 105 (B)	History of World Civilizations	2018	<ul style="list-style-type: none"> ➤ Students gain familiarity with the rise and characteristic features of the ancient world Civilizations, its regional extent and variation. ➤ Students can understand the glory of the civilizations, the nature of its cities and material remains and institutions.
	HST 106 (A)	Theoretical Concepts of Tourism	2018	<ul style="list-style-type: none"> ➤ Students gain familiarity with the rise and characteristic features of the ancient world Civilizations, its regional extent and variation. ➤ Students can understand the glory of the civilizations, the nature of its cities and material remains and institutions.
7.	HST 106 (B)	History of Medieval World	2018	<ul style="list-style-type: none"> ➤ Student can gain thorough knowledge on the world in medieval ages and rise of Christianity ➤ Will understand Transition to Modern Age ➤ Possess knowledge on French Revolution and its Impact
8.	HST 107	Human Values and Professional Ethics-I.	2018	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional

				<p>ethics which are essential for positive human behavior and actions in our daily lives.</p> <ul style="list-style-type: none"> ➤ They inspire the fundamental goodness of human beings and society at large
9.	HST 201	History of India 650-1206 A D	2018	<ul style="list-style-type: none"> ➤ Students can develop comprehensive knowledge on political, social, economic, religious and cultural history of early medieval India , regional polities and its impact ➤ Can also able to understand the circumstances lead to the invasions of Arabs and foundation of Muslim rule in India
10	HST 202	Social and Cultural History of India, 1206-1757	2018	<ul style="list-style-type: none"> ➤ Students can gain comprehensive knowledge on the freedom movement from its inception upto independence in India ➤ The students can also able to understand the role of national congress and prominent leaders of national movement, problems and perspective in the progress of freedom movement
11	HST 203	Freedom Movement in India, 1857 –1947	2018	<ul style="list-style-type: none"> ➤ The students can understand the Cold War and its Impact ➤ Possess knowledge on UN and the Concept of World Peace ➤ Gain the knowledge on the Disintegration of Socialist Block
12	HST 204	History of Contemporary World, 1945-2000	2018	<ul style="list-style-type: none"> ➤ This course provides comprehensive knowledge on the last imperial political formation in South India and the history of Vijayanagara, Bahmani and contemporary pretty powers. ➤ It helps to understand with the context of

				polity, economy, culture, religious and ideological changes
13	HST 205	A) History of Vijayanagara Empire B) History of Modern Africa	2018	<ul style="list-style-type: none"> ➤ Students will be familiar with Road to Independence in Africa ➤ They will understand development and underdevelopment in Africa
14	HST 206	A) Historical Application of Tourism in India B) Women Studies in Modern India	2018	<ul style="list-style-type: none"> ➤ The students can familiarize the knowledge needed to excel in tourism activities. ➤ It will equip the students with the solid foundation to build upon the fundamentals, useful skills and expertise that can assist employment in Tourism Industry.
15	HST 207	Human Values and Professional Ethics-II	2018	<ul style="list-style-type: none"> ➤ The student can understand thoroughly the importance of Women Studies ➤ Will understand the role of Women in Hinduism and Islam ➤ Also gain knowledge about the Women participation in various movements in India

14. Human Rights and Social Development

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1.	HR 101	Human Rights: Concepts and Theoretical Perspectives	2018	<ol style="list-style-type: none"> 1. To Expose the students about nature and concept of Human Rights. 2. To apprise the students about the Liberal. Marxian prerspectives. 3. To expose the students that alternative, third world and Indian Perspectives of Human Rights,
2.	HR 102	Human Rights in India the constitutional and Legal Framework	2018	<ol style="list-style-type: none"> 1. Students to know the Indian Constitution and Human Rights. 2. To understand the Judiciary and Human Rights. 3. To understand about Criminal Justice system in India.
3.	HR 103	Human Rights and Duties Education	2018	<ol style="list-style-type: none"> 1. To expose students about the importance of Human Rights and Duties education. 2. To apprise the students about the target groups for Human Rights <p>To expose the students about the content of Human</p>

				Rights Education.
4.	HR 104	Rights and the implementation Machinery	2018	<ol style="list-style-type: none"> 1. To expose the students about the implementation machineries at National Level and International Level. 2. The students understand about how the problems in Accessing Justice through Courts and Tribunals. 3. To expose the students that statutory bodies of Human Rights.
5.	HR 105 A	Working Class and Human Rights and Duties	2018	<ol style="list-style-type: none"> 1. To understand the students about the status of working class, concept and issues. 2. To expose the student about the basic rights and duties of various sections. 3. To understand the Indian Constitutional Frame work.
6.	HR 105 B	Human Rights Education, Teaching and Training	2018	<ol style="list-style-type: none"> 1. To expose the student about the origin, UNO and Human Rights education policies. 2. To apprise the students about the principles and practice in teaching of Human Rights Education. 3. To understand the student about training aspects of Human Rights.
7.	HR 106 A	Human Rights Activism and Role of NGOs	2018	<ol style="list-style-type: none"> 1. To expose the students about the different types of Human Rights Activisms. 2. To identify the student that the different Types of NGO's and their role for

				promoting the Human Rights.
8.	HR 106 B	Social Movements and Human Rights in India	2018	<ol style="list-style-type: none"> 1. To expose the students about the role of NGOs for protecting human rights. 2. To Understand the student about the Political Movements, Ecological and Environmental Movements of Human Rights. 3. To apprise the student about the various types of Social and Political Reforms of Human Rights.
9.	HR 107	Human Values and Professional Ethics - I	2018	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values. 2. To understand the student about nature of Values, Ahimsa and various religion theories. 3. To assess the student about various Crime and Theories of punishments
10	HR201	Human Rights and Indian Polity	2018	<ol style="list-style-type: none"> 1. To expose the students about the concept of basic structure of Indian Polity, administrative structure in India. 2. To apprise the student about the role of People's Agencies for protecting and promotion of human rights in India. 3. To understand the students about the Legislative Procedure and implementation process in India.
11	HR202	Emerging Dimensions of Human Rights	2018	<ol style="list-style-type: none"> 1. To expose the students about the Human Rights and Duties of Non-State

				<p>ArmedGroups and Commercial Corporations.</p> <ol style="list-style-type: none"> 2. To understand the students about the rights of future generation. 3. To apprise the students about the Human Rights and Changing Dimension of State Sovereignty and Humanitarian' Intervention.
12	HR203	Human Rights: The International Context	2018	<ol style="list-style-type: none"> 1. To understand the students about the evolution of human rights and UN charter of human rights. 2. To expose the students about regional dimensions of human rights and special conventions on human rights. 3. To understand the students about International conventions on human rights and duties.
13	HR204	Research Methodology, Statics and Computer Applications	2018	<ol style="list-style-type: none"> 1) Student to Know Scope of Social Research. 2) To Understand Data Analysis. 3) Understand About Types of Data Collections
14	HR205 A	Human Rights – The Socio Economic Context	2018	<ol style="list-style-type: none"> 1. To expose the students about the socio, economic background of human rights. 2. To apprise the students about human rights of vulnerable groups. 3. To understand the students about the basic

				human need for development with respect to human rights.
15	HR205 B	Societal Problems of Human Rights in India	2018	<ol style="list-style-type: none"> 1. To understand the student about the societal problems of human rights. 2. To understand the students about the social problems of minorities, scheduled caste and scheduled tribes. 3. To expose the students about Regionalism, terrorism.
16	HR206 A	Human Rights and Criminal Justice System	2018	<ol style="list-style-type: none"> 1. To expose the students about Rights of Inmates of Prisons and Custodial Homes. 2. To understand the students about the Right to Legal Aid, Access to Justice and Speedy Justice. 3. To expose the students that the problems of human rights.
17	HR207	Human Values and Professional Ethics - II	2018	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values. 2. To understand the student about nature of Values, Ahimsa and various religion theories. 3. To assess the student about various Crime and Theories of punishments.
18	HR 301	Social Movements and Human Rights and Duties	2018	<ol style="list-style-type: none"> 1. To expose the student about conceptual perspectives of social movements and human rights.

				<ol style="list-style-type: none"> 2. To apprise the students about the social, political and religious reforms movements and human rights. 3. To expose the students that the role of International and National Institutions in promoting Human Rights.
19	HR 302	Science, Technology, Human Rights and Duties	2018	<ol style="list-style-type: none"> 1. Understand the basic concept in science and technology and also about Indian perspective on science and technology. 2. Ability to know about the Right to Adequate Food, Agricultural, Biotechnology Impact of on Agriculture, Food Biotechnology and Revolution in Information Technology. 3. Analyse know rights to health and application of Biotechnology in Medicine and also about Intellectual Property Rights. 4. Assess the use of natural resource Environmental Biotechnology and Use Technologies
20	HR 303 A	Human Rights and Duties – Advocacy and Extension work and Viva-Voce	2018	<ol style="list-style-type: none"> 1. To understand the students that the issues for peoples movements and public advocacy on human rights and duties 2. To understand the students on extension

				<p>work with respect to human rights.</p> <p>3. To understand the students about the uses of NGOs fact finding and uses of information media.</p>
21	HR 303 B	Socially/Economically Disadvantaged people and Human Rights and Duties	2018	<p>1. To expose the students about the concept of the Constitutional Safeguards and Special Protection Laws and Policies.</p> <p>2. To understand the students about the concept of the disadvantaged people in the Indian Society.</p> <p>3. To understand the students about the Institutional Mechanisms for protecting the human rights of the disadvantaged groups.</p>
22	HR 303 C	Human Duties and Responsibilities	2018	<p>1. To understand the student about the concept of human duties and responsibilities.</p> <p>2. To expose the student about human values and values of humanism.</p> <p>3. To apprise the students about evaluation of human duties.</p>
23	HR 303 D	Children and Human Rights and Duties	2018	<p>1. To understand the student about the concepts of Child Labour and protecting norms at National and International level.</p>

				<ol style="list-style-type: none"> 2. To apprise the student that the status of children in Indian society with respect to human rights. 3. To understand the students about the National and International mechanisms for protecting the child rights.
24	HR 304	Soft Skills	2018	<ol style="list-style-type: none"> 1. To understand the student that the concepts of soft skills with respect to human rights. 2. To understand the student in employability skills in human rights aspects. 3. To expose the students that the professional skills for team building and problem solving.
25	HR 305 A	Historical and Philosophical Perspectives of Human Rights	2018	<ol style="list-style-type: none"> 1. To expose the student that the a basic understanding to the concepts of human rights, human values, dignity, justice and equality. 2. To understand the students that the theories of human rights in various inter disciplinary dimensions. 3. To apprise the student that the concept of Magna Carta-Billof Right-French and American- Declarationand Uncharted on human rights.
26	HR 305 B	Human Rights and Duties in India	2018	<ol style="list-style-type: none"> 1. To understand the students about the concepts of Constitutional Human Rights and Responsibilities. 2. To apprise the students that Extra-ordinary

				<p>situations and human rights in India.</p> <p>3. To understand the violations of rights in present Civil Society in India.</p>
27	HR 401	Human Rights in Andhra Pradesh	2018	<p>1. To expose the students about various Human Rights Movements at National and State (Andhra Pradesh) Level.</p> <p>2. To understand the concept of social stratification and problems of Caste and Untouchability.</p> <p>3. To expose the students that the gender inequality and various gender violation in Andhra Pradesh.</p>
28	HR 402	Development, Trade and Human Rights	2018	<p>1. To understand the student about the concept of human rights of various vulnerable groups at National and International level.</p> <p>2. To apprise the student about the Trade related human rights violations and Trade development.</p> <p>3. To understand the student about the role of human rights in development.</p>
29	HR 403 A	International, Humanitarian and Refugee Laws	2018	<p>1. To expose the students about the concepts of International Humanitarian Law and Implementation enforcements of IHL.</p> <p>2. To apprise the student about the concept of International Refugee Law and protection under International Law.</p> <p>3. To understand the students about solution to Refugee Problem.</p>
30	HR 403 B	Environment and Human Rights and Duties	2018	<p>1. To expose the student about the concept of</p>

				<p>Environment and rights to clean environment.</p> <ol style="list-style-type: none"> 2. To apprise the students about the International regimes for protection. 3. To understand the students about the role of various agencies for protecting environment with respect to human rights.
31	HR 403 C	Human Rights and Criminal Justice System	2018	<ol style="list-style-type: none"> 1. To expose the student about the concept of the International Human Rights systems. 2. To understand the student about the International Organisations for protecting the Human Rights. 3. To understand the students about the UN Organs and Human Rights.
32	HR 403 D	Minorities and Human Rights and Duties	2018	<ol style="list-style-type: none"> 1. To student understand that the concept of evolutionary perspectives and Institutional mechanisms for protection of Minorities. 2. To expose the student that rights and duties of Minorities under in the Indian System. 3. To apprise the student that the Minorities and human rights challenges.

33	HR 405 A	Development, Globalization and Human Rights	2018	<ol style="list-style-type: none"> 1. Understand to role of Human Rights in Development and various theories of development. 2. Analyses the new international Economic Order (NIEO),WTO GATT and International Trade and Human Rights Perspective in India. 3. Evaluvate the Globalisation and its impact on agriculture, environment, labour, women, culture and health. 4. Know about the Transnational Corporations (TNCs) and Human Rights violations and Impact of GATT-WTO on sovereignty.
34	HR 405 B	Women and Human Rights and Duties	2018	<ol style="list-style-type: none"> 1. To expose the students about the concept or the status of women in various sectors

				<p>with respective human rights.</p> <ol style="list-style-type: none"> 2. To expose students about the National and International norms for protection at International and National level. 3. To apprise the students about the Institutional mechanisms for Protection of rights of women.
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Human Rights and Duties

S.No	Course Name	Course Code	Year of Introduction	Course Outcomes
1	Human Values and Professional Ethics-I.	HR -106	2018	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at large.
2	Human Values and Professional Ethics-II	HR -205	2018	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at large.

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15. Law

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CO -101	Mass Media Law	2018	<ul style="list-style-type: none"> a. Have a detailed and sophisticated understanding of the general principles governing freedom of speech, the public interest and the media; b. Have a detailed, technical and specialised understanding of the constraints imposed on the media in the reporting of court proceedings; c. Have developed the ability to independently understand, research and critically analyse legal and scholarly developments that contribute to professional practice in the area of media law; and d. Have a detailed, technical and specialised understanding of defamation law in India and comparatively; e. Have developed expert knowledge of the practical operation of defamation law in India and comparatively;
2	CO-102	Public Utilities Law	2018	<ul style="list-style-type: none"> a. government policy in regard to such utilities in general and to each utility in particular, b. The growth and evolution of the public utilities; c. patters of the laws of incorporation and d. powers, functions and liabilities of the public utilities vis-a-vis their employees, consumers and others.

3	CO- 103	Law and Social Transformation in India	2018 2018	<ul style="list-style-type: none"> a. Critically analyse the Law as an instrument of social change and product of tradition and culture b. Explore the nature and function of Law as an institution and process interlinked with the social and economical philosophy of education. c. Examine development of law from historical processes and how for the a touch of modernization and value can be added to legal system d. To analyse the different approaches of Law and Justice
4	CO - 104	Indian Constitutional Law: The New Challenges	2018	<ul style="list-style-type: none"> a. Understand and interpret Constitution to address the emerging complex issues; b. Explore the various functional theories, doctrine and Constitutional principles working in the backdrop and its interplay with the emerging issues; and c. Examine the boundaries, limitations, of Constitution from different perspectives and explore the possible approaches of interpretation and understanding from the perspective of Law and Justice.
5	CO - 201	Union – State Finance Relations	2018	<ul style="list-style-type: none"> a. To understand India as development of complex federal structure (Quasi) federal and its strength and weaknesses; b. Explore the various functional theories, doctrine and Constitutional principles of federalism and its interplay under Indian Constitution; and c. To examine the area of conflicting interest between Union and State and primacy of Union over the State.
6	CO - 202	Constitutionalism, Pluralism and Federalism	2018	<ul style="list-style-type: none"> a. To explore the basic principles of Constitutionalism, different model of federalism

				<p>and its interplay in the Indian legal system;</p> <p>b. To examine the adoption of, utility and justification of Constitutional model in India; and</p> <p>c. To analyse India as pluralist society and suitability of various model, approaches in India in functional aspects of comparison with other legal system.</p>
7	CO – 203	Judicial Process	2018	<p>a. Intended to highlight the role of court as policy maker, participant in the power process and as an instrument of social change.</p> <p>b. expose the intricacies of judicial creativity and the judicial tools and techniques employed in the process.</p> <p>c. Since the ultimate aim of any legal process or system is pursuit of justice, a systematic study of the concept of justice and its various theoretical foundations is required.</p> <p>d. Intends to familiarise the students with various theories, different aspects and alternative ways, of attaining justice.</p>
8	CO – 204	Legal Education and Research Methodology	2018	<p>a. Critically analyse the various research skill, especially in the field of law;</p> <p>b. To develop the skill of application of teaching methods in legal education</p> <p>c. To understand and analyse the various strength and weakness of teaching learning and research process for the field of law; and</p> <p>d. To develop the skill of utilising computer technology for Legal education and Legal research.</p>
9	CO – 301	Human Rights	2018	<p>a. Acknowledge the social and economic rights of workers, forced labour, child labour, bonded</p>

				<p>labour, slavery, trade union, social security, right to health, standard of living, protection of families etc.</p> <p>b. To gain and acquire the knowledge about cultural rights of indigenous population.</p> <p>c. Understand the third-generation solidarity right of various populations.</p> <p>d. Acknowledge the ideas and knowledge about Human right Protection system of United Nations in the light of Covenant of Civil and Political rights.</p>
10	CO – 302	National Security, Public Order and Rule of Law	2018	<p>a. Understand and interpret various provision and safeguards to protection national security;</p> <p>b. To explore the various approach of public order, importance of rule of law and different legislations;</p> <p>c. Balancing the civil liberties and power of state; and</p> <p>d. Explore the various functional institution like election commission, parliament and check and balance on the national importance.</p>
11	CO- 303	Practical Training	2018	<p>a. Critically apply the understanding and application of legal research principles to legal research writing;</p> <p>b. To explore the various stages and its application for the practical record work;</p> <p>c. To have the development of idea, and its application;</p> <p>d. To have the ability to provide the original and non-plagiarised work to the existing field of knowledge</p> <p>e. Legal aid Camps and Legal Literacy Programmes,</p>

				<p>Court Observation work.</p> <p>f. On the completion of the course students will develop an inclination towards research and academics.</p>
12	CO- 304a	Environment Protection and The Law	2018	<p>a. Study the relationship between environment and climate change as well as the role of law, judiciary, resolution mechanisms but the alternate energy solutions and how people are dealing with climate changes, environmental laws and implementation of available solutions.</p>
13	CO- 304b	Intellectual Property Rights Law	2018	<p>a. To give philosophical underpinnings of traditional notion of property and IP •</p> <p>b. To examine the link between Industrial development & IP protection • To examine the conceptual development of IP concepts through judicial approach •</p> <p>c. To examine the impact of IP on economy, health and daily activities •</p> <p>d. To understand the basic principles enunciated in international agreements relating to IP</p>
14	CO- 401	Dissertation and Viva-Voce	2018	<p>a. Identify key research questions within the field of Demography on which you will carry out independent research.</p> <p>b. Manage your time effectively whilst working on your independent research.</p> <p>c. Demonstrate appropriate referencing and develop skills in other aspects of academic writing.</p> <p>d. Demonstrate knowledge and understanding of report writing.</p> <p>e. Apply the demographic/statistical research training acquired in the taught element of the programme by designing an appropriate research</p>

				strategy and research methodology to carry out your research
15	CO – 402a	Law of Consumer Protection	2018	<ul style="list-style-type: none"> a. Define provision under the Consumer Protection and Right to Information Act and apply them to situations accordingly b. Draft a consumer complaint with ease c. Confidently approach a Consumer Forum and get aware of the redressal mechanism d. To expose the students about Consumer Protection Laws; e. To develop the conceptual understanding of Consumer Protection regime.
16	CO- 404 b	International Human Rights (MOOC / ONLINE COURSE)	2018	<ul style="list-style-type: none"> a. Analyze and comment on key controversies surrounding the development of international human rights law b. Use conceptual tools to follow the developments of human rights law c. Be most effective in contributing to the enforcement of international human rights law

16. Library and Information Science

No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	LIS-101	Foundation of Library and Information Science	2018	<ul style="list-style-type: none"> 1. Know the various types of libraries and their role in the society 2. Learn the Professional ethics and library Legislation in India

				3. Understand LIS education in India and various library associations in India
2	LIS102	Knowledge Organization:Classification Theory	2018	<ol style="list-style-type: none"> 1.. Understand the definition, need and purpose of classification 2. Learn the Fundamental Categories, Facet Analysis, types of Isolates in all schemes of classification 3. Understand the Notation, trends and developments in Classification
3	LIS-103P	Knowledge Organization:Classification Practice	2018	<ol style="list-style-type: none"> 1.Learn the Dewey Decimal Classification Scheme 2. Get the skill regarding assigning the class numbers 3.Have knowledge on Tables and Schedules of DDC
4	LIS-104	Knowledge Management	2018	<ol style="list-style-type: none"> 1.Get an idea on the concepts of knowledge management, types of knowledge 2.Understand the knowledge creation models, knowledge transfer in E-World 3.know the tools for knowledge management and neural network and datamining
5	LIS-105	Introduction to Information Technology	2018	<ol style="list-style-type: none"> 1.Gain knowledge on the concepts of computer basics and Network technologies 2.Understand the concepts of Operating Systems, Programming Languages and types of softwares 3.Learn the Database Management systems, steps in development of databases and get an idea on

				different library software packages
6.	LIS-106	Human Values and Professional Ethics-I	2018	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
7.	LIS-201	Information Sources and Services	2018	<p>1.Learn documentary and non-documentary sources and different types of information sources</p> <p>2.Know about the Indian and British National Bibliographies, and Electronic Books</p> <p>3.Understand the virtual reference service and translation Services</p>
8.	LIS-202	Knowledge Organization: cataloguing Theory	2018	1.Understand the basic ideas on catalogue, forms of the catalogue, Main Entry and added entries

				<p>2. Know the Canons, Principles and Laws of Cataloguing</p> <p>3. Gain the knowledge on different types of subject headings, Cooperative and Centralized cataloguing</p> <p>.</p>
9.	LIS-203P	Knowledge Organization: cataloguing Practice	2018	<p>1. Gain knowledge on Anglo American Cataloguing Rules</p> <p>2. Learn the preparation of Main entry and added entries for monographs and serial publications</p> <p>3. Gain the skills on preparation of entries on cartographic materials, manuscripts and sound recordings</p>
10.	LIS-204P	Meta data Standards- Practice	2018	<p>1. Know the Metadata and its types, standards</p> <p>2. Learn the skills on KOHA Software</p> <p>3. Learn the skills on MARC 21 and Dublincore</p>
11	LIS-205	Library Management	2018	<p>1. Gain knowledge on meaning and purpose of management, Organizational Structures</p> <p>2. Able to identify the factors behind selection, procurement and accessioning of documents</p> <p>3. Gain knowledge on a circulation system suitable for a library, different budgetary methods and its standards, norms and principles</p>

12	LIS-206	Human Values and Professional Ethics-II	2018	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	LIS-301	Information Processing and Retrieval Theory	2018	<p>1.Understand the basic concepts on Information procession and Retrieval and various schemes on classification</p> <p>2.Learn the Indexing Systems and Techniques and their Evaluation Criteria and Studies</p> <p>3.Gain knowledge on Web based Information Retrieval Systems</p>
14	LIS-302	Library Automation and Digital Library	2018	<p>1.Learn the basics of Library Automation, various modules of library automation software packages and their features</p> <p>2.Gain knowledge on basic concepts and characteristics of digital libraries</p> <p>3.Know about network and communication devices, digitization and metadata</p>
15	LIS-303	Search and Search strategies	2018	<p>1.Gain knowledge on search strategies, various types of databases, internet searching tools</p> <p>2.Understand Z39.50 protocol and Wide area information servers</p> <p>3. 3.Learn the search engines and meta search</p>

				engines.
16	LIS-304B	Internship	2018	<ol style="list-style-type: none"> 1. Attain skills on all types of sections and its maintenance in libraries in which they underwent training 2. Get skills on maintenance of Digital Library 3. Learn the skills on preservation and conservation of manuscripts and digitization.
17	LIS-304C	Academic Library System	2018	<ol style="list-style-type: none"> 1. Know the basic objectives, growth and development of Academic Libraries in India, UK and USA 2. Learn about an overview of higher education in India, UGC, its powers and functions and its role in the development of academic libraries 3. Understand the total design of the building, techniques of financial management, and know the organization of library and information services needed by distance learners and special users
18	LIS-305A	Information Literacy (OE)	2018	<ol style="list-style-type: none"> 1. Learn the concepts of Information Literacy and sources of Print and Electronic Information 2. Get the skills on information access through INFLIBNET Network 3. Able to understand the Internet and its search techniques and Intellectual Property Right
19	LIS-401	Research Methodology	2018	<ol style="list-style-type: none"> 1. Understand the definition, need and purpose of various research methods 2. Get the knowledge on Research design, techniques and tools 3. Gain the skills on Data analysis and Interpretation of Data in SPSS.

20	LIS-402P	Software for Libraries-Practice	2018	<ol style="list-style-type: none"> 1. Attain knowledge on D Space, Greenstone Digital Library Softwares 2. Learn about Koha : Library Management Software, E-Resources, Directory of Open Access Journals, 3. Get an idea on designing of Web Page and Data Mining
21	LIS-403	Dissertation/Project Work	2018	<ol style="list-style-type: none"> 1. Gain Knowledge on how to select the theme for their work 2. Learn the writing styles, preparation of questionnaire, data analysis and interpretation and Citation styles 3. Get the skills on findings and conclusion in dissertation
22	LIS-403A	Management of Information System	2018	<ol style="list-style-type: none"> 1. Know the basic concepts in Management, and various methods of decision-making and its application to Library and Information Centers 2. Understand the budgeting techniques and methods and policies and procedures 3. Gain knowledge on system analysis, PERT/CPM
23	LIS -404C	Information Processing and Retrieval: UDC and Indexing Practice	2018	<ol style="list-style-type: none"> 1. 1. Gain knowledge on Universal Decimal Classification 2. Learn different Indexing systems 3. Understand the design and development of thesaurus

24	LIS-405-B	Technical Writing	2018	<p>1.Know the definition and types of technical writing</p> <p>2.Attain the idea on technical writing process and styles</p> <p>3.Get the skills on technical writing techniques, use of MS-Office for preparation and presentation of technical writing</p>
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17. Performing Arts(Music)

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	162	MA Performing Arts(Music)	2018	PAM-105 (P) Compulsory Foundation in Music -1 Clear cut training of foundation in Carnatic Music
2	162	MA Performing Arts(Music)	2018	PA-M 204 (P) Vilambakala Kritis Training to Perform slow tempo songs which is difficult rather than fast tempo songs
3	162	MA Performing Arts(Music)	2018	PA-M 205 (p) Compulsory Foundation in Music -2 Clear cut advance level training of foundation in Carnatic Music
4	162	MA Performing Arts(Music)	2018	PA-M 302 Compositions in Rare ragas widening knowledge to perform rare ragas
5	162	MA Performing Arts(Music)	2018	PA-M 303 Concert Ability to plan and execute a successful Carnatic concert Ability to create self employment opportunity
6	162	MA Performing Arts(Music)	2018	PA-M 402 Ragam Tanam Pallavi Learn and inculcate the most creative part of Carnatic Music To help student to shape out the creative rendering style of the student
7	162	MA Performing Arts(Music)	2018	PA-M 403 Project work Introduce to the methodology of doing research in music and introducing to data collection, analysis etc and train up him to look into the facts based on evidences
8	162	MA Performing Arts(Music)	2018	PA-M 404A Manodharma Sangeetha To enrich the knowledge of innovative music To educate the student to sing raga alapana neraval and Kalpanaswara which are the crucial Sections of creative music.

9	162	MA Performing Arts(Music)	2018	PA-M 404C Compositions of Dance Repertoire Knowledge in application of music in other art fields like theatre, opera etc Knowledge to select and utilize ragas according to the theme and text.
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19. Philosophy

16.philosophy				
S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
35	101	Classical Indian Philosophy	2018	.1The Student has applied the knowledge of classical Indian Philosophy. 2.The Student has analyzed the principles of classical Indian Philosophy
36	102	Epistemology Indian	2018	1. The Student has known the Indian Epistemology 2. The Student has understood the Pramanas in Indian Philosophy
37	103	Logic Indian and Western	2018	1. The Student has known the Indian Epistemology 2. The Student has understood the Pramanas in

				Indian Philosophy
38	104	Western Philosophy- Greek and Medieval	2018	<p>1.The Student has known the important issues of Western Philosophy</p> <p>2. The Student has understood the Principles of greeck and medieval Philosophy</p>
39	105-A	Problems in Metaphysics	2018	<p>1. The Student has known the Problems of Metaphysics</p> <p>2. The Student has understood the Principles of Metaphysics</p>
40	202	Ethics- Indian	2018	<p>1. The Student has known the Ethics in Indian Philosophy</p> <p>2. The Student has understood the various Ethical Principles in Indian Ethics.</p>
41	203	Ethics –Western	2018	<p>1. The Student has known the Ethics in Western Philosophy</p> <p>2. The Student has understood the Ethical theories of Western Philosophy</p>
42	204	Modern Western Philosophy	2018	<p>1. The Student has known the Problems of Modern Western Philosophy</p> <p>2. The Student has understood the thoughts of Modern Western Philosophers.</p>
43	205-A	Philosophy of Education	2018	<p>1. The Student has known the Contents of</p>

				Philosophy of Education. 2. The Student has understood the Educational aspects of Philosophy of Educatio
44	207	Audit course (HVPE)	2018	1. The Student has known the essence contents of human values. 2. The Student has understood the Professional Ethics..
45	301	Social and Political Philosophy	2018	1. The Student has known the contents of social Philosophy. 2. The Student has understood the Principles of Political Philosophy.
46	302	Philosophy of Vedanta	2018	1 . The Student has known the Philosophy of Vedanta. 2. The Student has understood the Philosophical Doctrines of Vedantas
47	303-A	Philosophical Approach to Gandhi	2018	1. The Student has known the metaphysical issues of Gandhi. 2. The Student has understood the Gandhian Philosophy
48	303-B	Philosophy of B.R.Ambedkar	2018	1. The Student has analyzed the Philosophy of Ambedkar.. 2. The Student has applied the Philosophical aspects of Ambedkar.
49	305-A	Philosophy of Value Education	2018	1.The Student has known the importance of Education... 2. The Student has understood the Philosophical values for life.

50	305-B	Sri Venkateswara Studies	2018	
51	401	Phenomenology and Existentialism	2018	<ol style="list-style-type: none"> 1. The Student has analyzed the contents of Phenomenology.. 2. The Student has applied the Philosophical Principles of Existentialism
52	402	Comparative Religion	2018	<ol style="list-style-type: none"> a.The Student has analyzed the aspects of Comparative Religion.. b. The Student has applied the Philosophical Principles of different Religions
53	403-A	Philosophy of Jiddu Krishnamurti	2018	<ol style="list-style-type: none"> 1.The Student has known the Philosophy of Jiddu Krishnamurti... 2. The Student has understood the Philosophical insights and of jiddu Krishnamurti
54	403-B	Analytical Philosophy	2018	<ol style="list-style-type: none"> 1. The Student has known the contents of Anaytical Philosophy. 2. The Student has understood thePhilosophy of Philosophers of Analytical Philosophy..
55	403-C	Sri Vaishnavism	2018	<ol style="list-style-type: none"> 1.The Student has analyzed the aspects of SriVaishnavism.. 2. The Student has applied the Philosophical Principles of .SriVaishvaism
56	403-D	Research Methodology and Computer Applications	2018	<ol style="list-style-type: none"> 1.The Student has analyzed the principles of Research Methodology.. 2. The Student has applied the computer operating and applying

				principles
57	405-A	Philosophy of Yoga	2018	1.The Student has analyzed the principles of Research Methodology.. 2. The Student has applied the computer operating and applying principles

20. Physical Education

S.No	Name of the Course	Course Code	Year of introduction	Course Outcomes
1	B.P.Ed	Bachelor of Physical Education	2014-15	100%
2	Ph.D	Ph.D	2008	100%

21. Political Science & Public Administration

22. Population Studies

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	PS- 101	Population Characteristics and Theories	2018	<ul style="list-style-type: none"> i. Identify basic demographic concepts and definitions in Population studies ii. Impart knowledge on Population trends in size and growth of population at regional, national and global level. iii. Discover the implications of different theories on past and present population components with special reference to Malthusian theory
2.	PS - 102	Fertility	2018	<ul style="list-style-type: none"> i. Examine the basic concepts and measurements of

				<ul style="list-style-type: none"> ii. fertility Assess, compare and contrast trends in fertility and its determinants iii. Familiarize the concepts of nuptiality and factors affecting nuptiality
3.	PS – 103	Mortality	2018	<ul style="list-style-type: none"> i. identify the various concepts and measures of mortality ii. Examine the global levels and trends in mortality and its determinants iii. Acquire knowledge on techniques of life tables, constructions of multiple-decrement life table and computational aspects for demographical analysis
4.	PS 104	Sources, Evaluation and Adjustment of Data	2018	<ul style="list-style-type: none"> i. Examine and compare merits and demerits of various sources of population data ii. Understand the evaluation of data, factors affecting completeness of data iii. Reproduce knowledge on population projections, calculations and applications
5.	PS – 105	Population Education and Extension	2018	<ul style="list-style-type: none"> i. Examine the components of population education and create awareness on population education among the students and youth ii. Acquire skills to organize Extension Programmes in population education at school, college and Non formal educational levels iii. demonstrate training on population education methods and techniques in order to create awareness on population education
6.	PS - 106	Human Values and Professional Ethics-I	2018	<ul style="list-style-type: none"> i. Identify the concepts of ethics and its relation to religion, politics and environment ii. Memorize the different aspect of values and interpret the best skills in understanding the merits of value related aspects iii. Demonstrate to interpret crime and theories of

				punishment with special reference to acquire knowledge on Manu and Yajnavalkya
7.	PS – 201	Migration and Multi Regional Demography	2018	<ul style="list-style-type: none"> i. Explore the different types and trends in migration ii. Apply skills in measurement, causes and consequences of different migrations in different regions iii. Explore the theories and recommend suitable policies of migration
8.	PS – 202	N.G.O Management & Field Work Orientation	2018	<ul style="list-style-type: none"> i. Understand the role, importance and establishing of NGO ii. Explore the sources of funding of NGO's at national and international level iii. Explore demographic data by working with individuals, groups and communities
9.	PS - 203	Statistical Methods	2018	<ul style="list-style-type: none"> i. Familiarize the basic statistical methods and its applications to demographic data ii. Demonstrate knowledge on methods and techniques of sampling iii. Acquire skills in processing of data with computer
10.	PS - 204	Population Sociology	2018	<ul style="list-style-type: none"> i. Examine the basic sociological concepts, and evaluate the relationship of sociology to other social sciences ii. Identify the social institutions, social change and socialization iii. Explore the sociological theories of fertility and its application in contemporary society
11.	PS - 205	Fundamentals of Social Work	2018	<ul style="list-style-type: none"> i. Memorize the basic concepts of social work and its nature and scope. ii. Recognize the different methods of social work iii. Explore the social work practice in different fields iv. Acquire knowledge on the evolution of social

				<p>work in India</p> <p>v. Explore the professional associations and importance of networking in social work profession</p>
12.	PS – 206	Human Values and Professional Ethics - II	2018	<p>i. Acquire and gain knowledge on different concepts of human values and behavioural changes.</p> <p>ii. Recognizing the medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics of medical and health care professionals.</p> <p>iii. Acquire skills on environmental ethics and its relation to Health</p>
13.	PS - 301	Population Geography	2018	<p>i. Enumerate the geographical factors affecting the distribution of population</p> <p>ii. Awareness and understanding of trends in urbanization and its impact on ecological imbalance, global warming, greenhouse effects.</p> <p>iii. Able to assess changing pattern of land use, conservation of resources and critical thinking of policies, programmes for better management of environment</p>
14.	PS - 302	Research Methodology	2018	<p>i. Demonstrate in conducting population research and surveys</p> <p>ii. Prepare research design and apply sampling techniques</p> <p>iii. Discover skills in methods and tools of data collection, data analysis, interpretation, and report writing.</p>
15.	PS - 303	Community Health	2018	<p>i. Discover comprehensive knowledge on concepts of community health, illness, disease prevention</p> <p>ii. Critical thinking on epidemiology, communicable diseases and its prevention</p> <p>iii. Understand and appreciate the concepts of health,</p>

				nutrition, balance diet, nutrition deficiency diseases and National Health Programmes
16.	PS – 304 a	Population Psychology	2018	<ul style="list-style-type: none"> i. Appreciate the scope of psychology and the relationship between value of children and fertility ii. Familiarize and comprehend the significant psychological theories relevant to fertility and contraceptive behavior iii. Demonstrate leadership and effective communication skills in promoting health and family planning
17.	PS – 304 b	Population Policies and Programmes	2018	<ul style="list-style-type: none"> i. Explore population policies related to fertility, mortality and migration ii. Acquire the knowledge on methods of family planning and acts relating to medical termination of pregnancy, age at marriage and also registration of vital events iii. Apply best practices and strategies for promoting family welfare programme.
18.	PS – 304 c	Gerontology	2018	<ul style="list-style-type: none"> i. Understand the scope of gerontology and demographic dimensions of the elderly ii. Critically explore and analyze changes in status of elderly health, problems and needs of elderly iii. Acquire skills in dealing elderly issues like neglect, abuse, violence and abandonment caregivers stress and elderly neglect
19.	PS – 304 d	Population and Sustainable Development	2018	<ul style="list-style-type: none"> i. Examine the concepts and theoretical issues relating to sustainable development and sustainable goals ii. Assess and measure the quality of life, resource creation, and management and distribution iii. Critically think of the relationship between population, environment, poverty and population

				sustainable growth
20.	PS-305 a	Principles of Population Studies	2018	<ul style="list-style-type: none"> i. Explore the components of population change, trends in size and growth of population ii. Discover the concepts of fertility, mortality and migration iii. Acquire skills in exploring the sources and quality of data on fertility, mortality and migration
21.	PS – 305 b	Population, Society and Environment	2018	<ul style="list-style-type: none"> i. Understand the components of population change and sociological consequences ii. Demonstrate sociological perspective to analyze the relationship between man, ecology and environment iii. Critical thinking of Sustainable development and its concepts
22.	PS - 401	Communication for Family Welfare Programmes	2018	<ul style="list-style-type: none"> i. Examine the elements in communication process ii. Understand and apply different approaches to communication iii. Critically analyze and apply factors influencing a various communication methods to promote family planning
23.	PS – 402	Reproduce Health and Adolescent Issues	2018	<ul style="list-style-type: none"> i. Examine the anatomy and physiology of human reproduction, conception and pregnancy ii. Describe the male and female reproductive health problems iii. Assess and examine various adolescent issues
24.	PS - 403	Population Growth and Development	2018	<ul style="list-style-type: none"> i. Understand the indicators of development with special reference to population growth and development. ii. Discover the concepts of economic inequality and its causes iii. Examine the status of women and development and demographic consequence of women empowerment

25.	PS – 404 a	Dissertation	2018	<ul style="list-style-type: none"> i. Develop in-depth knowledge of field work and community surveys ii. Acquire the skills to present and discuss the findings through seminars iii. Explore the skills in preparation and presentation of research findings
26.	PS – 404 b	Demography of Andhra Pradesh	2018	<ul style="list-style-type: none"> i. Acquire knowledge on basic trends and changes in population growth in Andhra Pradesh ii. Examine the migration and urbanization, problems of slums and related policies with special reference to Andhra Pradesh iii. Explore the population policies and programmes in Andhra Pradesh
27.	PS – 404 c	Social Work in Industry and Human resource Management	2018	<ul style="list-style-type: none"> i. Understand the concepts, principles and functions of Management ii. Acquire skills on difference process of Human Resource management iii. Demonstrate the organizational behavior, management conflicts and organization of interventions iv. Concepts of Industrial relations and related legislations for industrial workers
28.	PS – 404 d	Health Economics	2018	<ul style="list-style-type: none"> i. Explore the concepts in economics in relation to health and population dynamics ii. Acquire skills in assessing costing and health economics iii. Critically analyze and evaluate general health status and quality of life and also measurement of health outcomes
29.	PS – 405 a	Rural, Urban, Tribal Development	2018	<ul style="list-style-type: none"> i. Explore the characteristics of rural, urban and tribal community ii. Discover community development and

				<p>experiment projects in rural, urban and tribal areas</p> <p>iii. Critically examine and understand the issues related to rural, urban and tribal areas and approaches to community development</p>
30.	PS – 405 b	Social policies and planning	2018	<p>i. Discover social policies in relation to Indian constitution.</p> <p>ii. Examine the approaches to social policy</p> <p>iii. Demonstrate and analyze various social policies and their implementation</p>

Masters in Social Work

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	MSW- 101	Sociology for Social Work	2018	<p>i. Discover basic concepts in Sociology and examine the relation between individual and society.</p> <p>ii. Distinguish between Socialization, Social institutions and Social groups</p> <p>iii. Critically demonstrate , Social Stratification, Social Deviance, Social Change and Social Problems</p>
2.	MSW - 102	Human Growth and Personality Development	2018	<p>i. Memorize various stages of Human Growth and Development</p> <p>ii. Identify different concepts of Human Behavior like Motivation, Perception, Learning and</p>

				<p>Attitudes</p> <p>iii. Discover experience in assisting the person in Solving their Psycho social problems through personality development and adjustment</p>
3.	MSW – 103	Social Work Profession & Field Work Orientation	2018	<p>i. Recall various concepts like Social Service, Social Welfare, Social Development and Social Work</p> <p>ii. Experiment on Ethical Values of Professional Social Work and analyze current trends in Social Work</p> <p>iii. Design field work in Social Work and acquire skills to involve the client in problem solving process</p>
4.	MSW 104	Social Work Practice with Individuals & Groups	2018	<p>i. Recognize the basics Concepts , Techniques and Skills of case work</p> <p>ii. Apply different approaches of Case Work, Group Work</p> <p>iii. Evaluate the application of Social Case Work and Group Work at various settings like Schools, Hospitals, and Correctional Settings and in Communities.</p>
5.	MSW – 105	Social Work Practicum - I	2018	<p>i. Recognize the significance of Social Work in various settings</p>

				<ul style="list-style-type: none"> ii. Illustrate the application of Social Work Methods in the agencies during their field practicum iii. Examine the applications of Social Work Principles and Skills in the functions of different organizational systems
6.	MSW - 106	Human Values and Professional Ethics-I	2018	<ul style="list-style-type: none"> i. Familiarize the concepts of ethics and its relation to Religion, Politics and Environment etc. ii. Able to gain knowledge on different aspect of Values and Interpret the best Skills in understanding the merits of value related aspects iii. Discover to interpret Crime and Theories of Punishment with special reference to Manu and Yajnavalkya
7.	MSW – 201	Social Work Profession & Field work Orientation	2018	<ul style="list-style-type: none"> i. Recognize the Scope, Importance and Significance of Social Work Practice in different fields ii. Acquire Knowledge and Skills Essentials for Working with Groups and Communities iii. Formulate Capacity Building by organizing training and awareness programmes in the Field Work Settings
8.	MSW – 202	Social Work Practice with Communities	2018	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in

				<p>Community organization and Social Work practice</p> <p>ii. Appraise various approaches in Community Organization and Current issues in Community Organisation</p> <p>iii. Organize community participation using PRA methods and techniques</p>
9.	MSW - 203	Social Action and Social Legislation for Social Work Practice	2018	<p>i. Distinguish the elements of Social action, Models and Process of Social Action</p> <p>ii. Connect the Social Legislations with Social Work Practice</p> <p>iii. Appraise Laws pertaining to Women, children and Aged in Social work practice</p>
10.	MSW - 204	Social Policy and Planning	2018	<p>i. Examine the nature and Approaches of Social Policy in the Socio-economic and political context</p> <p>ii. Assess the implementation of Social Welfare Policies in Education, Health, Women, Children and Environment</p> <p>iii. Examine the Role of Social Workers in Formulating , Planning and Implementation of Social Policies</p>
11.	MSW - 205	Social Work Practicum-II	2018	<p>i. Examine the Nature, Scope and Functions of the different Government and non-profit organizations</p>

				<p>agency at ground level</p> <p>ii. Trained to assist their supervisor with in the limitations of the agency</p> <p>iii. Equipped with Professional Skills and Techniques through practical exposure</p>
12.	MSW – 206	Human Values and Professional Ethics - II	2018	<p>i. Summarize different concepts of Human Values and Behavioural changes required for adjustment in Family and Society</p> <p>ii. Demonstrates Medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics in Medical and Health care professionals.</p> <p>iii. Acquire Skills on Environmental ethics and the Environment and Health</p>
13.	MSW - 301	Social Work Intervention with Families	2018	<p>i. Discover the Family Centered Practice as a Model of Social Work practice and understand Family life management and Family Dynamics</p> <p>ii. Demonstrate Family Assessment and Application of Tools : Interviewing , Ecological assessment – Eco map , Generation assessment- Genogram, Triangle, Family Sculpture and Family Mapping</p>

				<ul style="list-style-type: none"> iii. Integrate social work practice with Families and Social Work Therapeutic Interventions wherever appropriate
14.	MSW - 302	Social Work in the Field of Health	2018	<ul style="list-style-type: none"> i. Examine the concept of Health, factors affecting health and Indicators of Health. ii. Evaluate Primary and Community healthcare services with special references to communicable and Non-communicable diseases iii. Assess the relevance, domains and nature of Social Work Intervention in different Health settings.
15.	MSW - 303	Counseling in Social Work Practice	2018	<ul style="list-style-type: none"> i. Understanding the basics of Counseling and Approaches of Counseling ii. Develop ability to apply appropriate Counseling Techniques with Special Group iii. Demonstrate to apply Counselling Skills while working with clients in various settings like Health ,Family and School Settings
16.	MSW – 304 a	Social work Research	2018	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in Social Work Research process and Statistics ii. Illustrate single subject and evaluation Research Designs along with various Research designs iii. Facilitate methods of Sampling, Data Collection,

				Analysis, Statistical-Applications and Report Writing
17.	MSW – 304 b	Gerontological Social Work	2018	<ul style="list-style-type: none"> i. Identify the Scope of Social Work in the field of Gerontology. ii. Illustrate Changes in the status of Elderly, Health problems and needs of Elderly. iii. Experiment the social work interventional strategies to Elderly ,Care givers and Counseling
18.	MSW – 304 c	Social Work Practicum-III	2018	<ul style="list-style-type: none"> i. Analysis the role of Community and dramatize the Community Organisation in field work practice ii. Develop skills and expertise their Field Work exposure to organize community programmes iii. Examine the new Intervention programs in the area of their specialization to bring a solutions to the problems in different community
19.	MSW – 304 d	Human Rights and Social Legislation	2018	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in Human rights ii. Distinguish various Social Legislations and Legislations related to Women and Children iii. Nurture the Social Work Professionals by creating awareness on various current issues and related Legislations

20.	MSW-305 a	Principles of Population Studies	2018	<ul style="list-style-type: none"> i. Demonstrate the concept of Population Studies, Components of Population Change Population Structure ii. Interpret basic concepts and measures of Fertility, Mortality ,Mobility and Migration iii. Critically evaluate the Concept of Multi Regional Demography, its uses and limitations
21.	MSW – 305 b	Fundamentals of Social Work	2018	<ul style="list-style-type: none"> i. Examine basic concepts, Principles and Methods of Social Work ii. Defend values and Principles of Professional Social Work and Code of ethics for Social Workers iii. Evaluate Social Work Education in India, Professional Associations, Problems of Professionalization and Networks in Social Work
22.	MSW - 401	Social Work Intervention with Children	2018	<ul style="list-style-type: none"> i. Examine the Significance and Development of Child Welfare Services with special reference to Child Rights ii. Appraise various Institutional and Non-Institutional services for children in need iii. Create Professional Knowledge on Social Work Intervention with children in difficult situations

23.	MSW – 402	Rural/Urban/Tribal Development & Empowerment –I	2018	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in rural Urban and Tribal community and Community Development Projects across the country ii. Trained to meet the challenges specifically related to Rural, Urban and Tribal communities iii. Will nurture the Social Work Professionals to become effective Social Worker and contribute to community by conducting awareness camps, strengthening Self-Help Groups and Facilitating Empowerment in the communities.
24.	MSW - 403	Social Work in the Field of Mental Health	2018	<ul style="list-style-type: none"> i. Understand the concept and importance of Mental Health and Psychiatric Social Work ii. Distinguish Psychiatric disorders and application of Therapeutic Interventions in Psychiatric Illness iii. Plan to provide Psychiatric Rehabilitation to assist Mentally Ill patients
25.	MSW – 404 a	Social Work in Industry & Human Resource Management	2018	<ul style="list-style-type: none"> i. Enrich knowledge on HRM, Personnel management, HR planning and ii. management systems iii. Appraise organizational behavior, conflict Resolution Strategies and Legislation related to

				<p>industrial relations</p> <p>iv. Develop skills in Industrial Social Work Practice and the role and significance of Corporate Social Responsibility</p>
26.	MSW – 404 b	Social Work Practicum-IV	2018	<p>i. Acquires training in the organization as social worker and develop sound knowledge on social work which will motivate them to start an NGO</p> <p>ii. Evaluate projects and organize programmes for fund raising</p> <p>iii. Hypothesize research in their area of specialization through which they can suggest recommendations to agencies for improving quality</p>
27.	MSW – 404 c	Social Work Practicum-V	2018	<p>Learn Skills and able to apply Principles during the Internship in Block Placement</p> <p>Explore research studies at Micro levels and submit reports as Mini Project Work</p> <p>Demonstrate as effective Social Worker in the agency in which they are placed</p>
28.	MSW – 404 d	Social Work and Disaster Management	2018	<p>i. Summarize and understand the disasters and Disaster Management</p> <p>ii. Acquire a critical perspective of the policy framework, Institutional Structures</p>

				and programmes for Disaster Management in India iii. Explore Mental health consequences and able to provide Psychosocial care in Disaster Management
29.	MSW – 404 a	NGO Management	2018	i. Distinguish the Concept, Structure, Registration and By laws of NGOs ii. Demonstrate Organisational Management and source of funding of NGOs iii. Familiarize to organize Human Resource Management in NGOs
30.	MSW – 404 B	Health Education	2018	Discover the Roles, Responsibilities, Approaches and ethics in Health Education Describe the Behavioral, Environmental, and Genetic risk factors for Communicable and Non- communicable diseases. Evaluate channels of Health education and organizational health set up at Central, State and District levels

23. Sanskrit

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SNSKT 101	Elements of Darsanas-I	2018	An understanding of the evolution of Darsanas I.To create an awareness of the Darsanas ii.Acquire Knowledge of the Baudda and Jaina Darsanas

				iii.To get the Knowledge of Meemamsa Sastra
2	SNSKT-102	Vedic Texts-I	2018	I.Students able to get the Vedic knowledge II.Students know the importance of Vedic gods III.Students are understanding the Vedic chandas IV.To make understanding the spiritual knowledge through Kathopanishat
3	SNSKT-103	PROSE AND POETRY-1	2018	I.An understanding of evolution of Sanskrit poetry across the ages until the modern age II.Get the knowledge of gadya kavya III.Understand the poetical skills IV.Understand the importance of kiratarjuneeya in Sanskrit literature
4	SNSKT-104	DRAMA, ALANKARA AND PROSODY -1	2018	Student will be able to get I.Understanding the features of Sanskrit drama II.Knowledge of organ and development of Sanskrit dramas III.Understanding the efficiency of kalida's poetic skill. IV.Get the knowledge of chandas V.Get the knowledge of different types of chandas
5	SANSKRT105(A)	HISTORY OF SANSKRIT LITERATURE – 1	2018	After completed of course the students are able to I.Know the origin and development of Sanskrit literature II.Know the importance of Vedas and its date. III.Know the meaning and contest of Brahmanas, Aranyakas and Upanishads IV.Know the social conditions as reflected in the Brahmanas V.Know the importance of Ramayana and its date
6.	SANSKRT :105(B)	DRAMA AND POETRY - 1	2018	I.Students will be able to gain understanding the features of Drama, Sentiment Moralities II.Through understanding the importance and place of Rasa in the Drama III.The knowledge about the skillfulness of Bhavabhusin Dramatergy IV.Recognize the transpiration of human experiences into dramatic experiences

				V.The knowledge about importance of Sandesa Kavyas in Sanskrit Literature
7.	SANKT :105(C)	ALANKARA AND PROSODY – 1	2018	I.Students will understand the different types of Alankara II.Know the importance of Alankara in the poetry III.Understand the development of on the basis of similar IV.Recognize the Guru and Laghu in prosody V.Know the importance of melody through prosody
8.	SANSKRT:106(A)	COMPARATIVE PHILOLOGY AND SIDDHANTA KOUMUDI- 1	2018	After completion of the course students are able to- I.Find out the main causes of semantic change II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing skills without grammatical mistakes..
9.	SANSKRT:106 (B)	KAVYALANKARA SUTRA VRITTI –I	2018	I.Know the definition of poetry and prose II.Know the different types of Kavya III.Understand the different types of Riti IV.Understand the Pada and Padartha Doshas.
10.	SANSKRT:107	HUMAN VALUES AND PROFESSIONAL ETHICS –I	2018	After completion of the course students are able to I.Understand Bhagavad Gita as a guide for modern life style II.Know the principles of Buddhism and Jainism III.Realize the necessary of practicing Human values and ethics in walks of life IV.Acquire the knowledge of Good and Bad V.Know the about crime and punishment according manu and Yajnavalkya
11	SANSKRT – 201	ELEMENTS OF DARSANAS –II	2018	After completion of the course students are able to – I.Understand the knowledge of upamana and sabda pramanas II.Get the knowledge of Ayatharthanu Bhava III.Understand the Bahavana IV.Understand the Principals of Sankhya
12	SANSKRT –	VEDIC TEXTS –II	2018	Students will know-

	202			I.The importance of Suktas II.The definition and purpose of Nirukta III.The meaning of Vedic words
13	SANSKT – 203	PROSE AND POETRY – II	2018	Students will able to get I.The beautification of prose literature. II.Enhancement of knowledge in appreciation of classical poetry III.Understanding about text that are selected. IV.Teaching skills in prose and poetry.
14	SANSKT – 204	DRAMA ALANKARA AND PROSODY – II	2018	Students will know I.The different characteristic features in Dramas II.The importance of nature and hermitages III.The features of Alankara and Classification of Alankaras IV.The knowledge of prosody
15	SANSKT – 205 (A)	HISTORY OF SANSKRIT LITERATURE –II	2018	After the completion of the course students are able to I.Know the features of Mahakavyas II.Know the structure of Drama and social message III.Know the moral values through the tales IV.Get the glance of classical Sanskrit literature
16	SANSKT – 205 (B)	DRAMA AND POETRY – II	2018	I.Get knowledge of good II.Know the character of Hero and Hero in etc., in the Drama III.Know the changes stories between original and creativeness IV.Know the importance skill fullness in poetry of Kalaidasa
17	SANSKT – 205 (C)	ALANKARA AND PROSODY – II	2018	I.Know the features and Examples II.Understand the different types of Uktis in Alankaras III.Know the difference between stuti and Ninda Alankaras IV.Get knowledge of sikharini and Mandakranta vrittas V.Know the definition and importance of Gayatri Matras
18	SANSKT -	COMPARATIVE	2018	After complication of the course students are able to –

	206 (A)	PHILOLOGY AND SIDDHANTA KAUMUDI – II		I.Find out the main causes of semantic change II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing Skills without grammatical mistakes
19	5 (B)	KAVYALANKARA SUTRA VRITTI – II	2018	I.Know the difference between Guna and Alankara II.Ability to understand the theory of Riti III.To enable to understand the usage of Sabdalankaras IV.Know the contribution of Vamana to alankara sastra
20	SANSKT - 207	HUMAN VALUES AND PROFESSIONAL ETHICS - II	2018	I.Understand the relevance of value based education in modern society II.Understand the old traditions of medical ethics III.Understand the solutions of illegal and unethical practice IV.Understand the man and nature, Natural calamities and get the solution regarding those situations.
21	SANSKT :301	(Sahitya) RASAGANGADHARA, (ANANA.I) – I (IE)	2018	After the completion of the course students are able to I. Understand the Rasaswarupa II.Understand the purpose of Kavya and different types of Kavya III.Know the interpretations of Rasa sutras and ten types of Gunas IV.Know the Abhasas
22	SANSKT :302	DHVANYALOKA - 1	2018	on completion of the course students are able to I.Understand the Dhvani swarupam II.Understand the opinion of Dhvanyabhavavadins III.Know the Dhavanikavya Lakshana IV.Know the Vyangya as Kavyatma V.Get the knowledge of splendid sastra Dhvanyaloka
23	SANSKT :303-A	KAVYAPRAKASA AND DASARUPAKA-1(IE)	2018	Students will get - I.The knowledge of definition of kavya, types of kavyas II.The Knowledge about verities of vyangya III.The Knowledge of vyanjanaswarupa IV.An idea of ten types of Rupakas

24	SANSKT:3 03-B	HISTORY OF SANSKRIT POETICS AND SANSKRIT ESSAY-I	2018	On completion of the course students are able to I. Get the knowledge of sentence formation to write the essays on different issues II. Acquire the knowledge of Alankarikas III. Understand the different theories in Alankara sastra. IV. Understand the theory of Alankara and Rithi.
27	SANSKT:3 04	Personality Development in Pancatantra (Mitrabheda and Mitrapraptikam only)	2018	.I. Know the losses arriving out of Non friendship II. Know the world knowledge III. Achieving personality development through Panchatantra
29	SANSKT:3 05-B	Raghuvamsam (Ist canto only)	2018	on completion of the course students are able to I. Understand the greatness of Sanskrit Language II. Know the greatness of poetry III. Get knowledge on panchamahakavya's after the epic literature IV. Get the knowledge about the kalidasas Natural and beautiful creations V. Understand the uses of upamalankara by kalidasa
30	SANSKT:4 01	(SAHITYA) RASAGANGADHARA (ANANA-I)	2018	After completion of the course students are able to I. Know the number of Rasas in kavyas II. Know the uses of Rasa to elevate the situations in kavya III. Acquire the knowledge of Gunas and their role in Kavyas IV. Understand the differentiation of Bhava in Alankara sastra.
31	SANSKT :402	DHVANYALOKA –II	2018	Students will be able to get- I. The knowledge about different forms of schools II. Knowledge about the classification of Dhvani Siddhanta III. Knowledge regarding different alankara dhvanis IV. Know the difference between Rasadhvani and Rasavadalankara

				V.Know the main Rasa in Ramayana and Mahabharatha
32	SANSKT:4 03(A)	KAVYAPRAKASA AND DASARUPAKA-II	2018	After the completion of the course students are able to – I.Understand the structure of the Kavya II.Get the knowledge of Rasa and it's Bhedas III.Find out the classification of Dhvani IV.Understand the Lakshana of Nataka V.Get the knowledge about 10 types of Nataka Bhedas
33	SANSKT:4 03(B)	HISTORY OF SANSKRIT POETICS AND SANSKRIT ESSAY-II	2018	After the completion of the course students are able to – I.Get the knowledge of writing skills II.Acquire the knowledge of several Aesthetic poets like Mammata, Ruyyaka III.Understand the main theories on kavya of different poets IV.Get the knowledge of presentation skills on social related issues
36.	SANSKT :404	Introduction to Epigraphy and Manuscriptology	2018	After the completion of the course students are able to I.Get the knowledge of inscriptions II.Acquire the knowledge of Brahmi and kharoshthi scripts III.Get the knowledge of writing materials in Ancient India IV.Get the knowledge of edition and critical edition of Manuscripts
37.	SANSKT :405 (A)	Hithopadesa of Narayanapandita Mitralabha and Mitrabheda	2018	Students will be able to I.Get the moral values II.Understand the mentality of different kinds of people in the society III.Acquire the knowledge to behave a good citizen and a well human being IV.Understand the message through neetikavya

24. Sociology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MASO-101	Classical Sociological Theories	2018	<ol style="list-style-type: none"> 1. This paper seeks to expose the students to the classical thinkers and their contribution in building theoretical sociology. 2. To Compare and contrast the basic theoretical perspectives of sociology 3. To acquaint students with recent trends in Sociological thought.
2	MASO -102	Sociological Research Methods and Statistics	2018	<ol style="list-style-type: none"> 1. This course aims to enable the students to understand the fundamental nature of the scientific approach towards social research and apply the skills in undertaking social research. 2. To equip the students with strategies of development for different segments of society. 3. To provide ways and means of understanding and studying social reality
3	MASO -103	Indian Society and Inclusive Growth	2018	<ol style="list-style-type: none"> 1. This paper presents a comprehensive and integrated profile 2. To gain a better understanding of past and present structure and continuity of society 3. Identify and analyze the problems in Indian society and suggest solutions from sociological perspective
4	MASO -104	Participatory Research	2018	<ol style="list-style-type: none"> 1. This paper is to inspire students to undertake research in partnership with stakeholders 2. To explain the emancipatory and empowering,

				<p>collaborative and reflective approaches</p> <p>3. To discuss the relationship between PRA and scientific method to incorporate the results to change the practice and policy.</p>
5	MASO -105	Principles of Sociology	2018	<p>1. This paper gives the students an understanding of the basic principles of Sociology as an academic discipline</p> <p>2. To analyze the ways in which people interact and function in groups</p> <p>3. It provides a basic knowledge on the fundamental aspects of the important social institutions</p>
6.	MASO -106	Human values and Professional Ethics - 1	2018	<p>1. To help students distinguish between values, skills, and understand the need, basic guidelines, content and process of value education</p> <p>2. To provide Human Values and Ethics relating to Religion, Business, Law, Media and Environment</p> <p>3. To provide an in depth knowledge about the Moral and ethical values for interpretation in their day to day life</p>
7.	MASO -201	Applied Sociology	2018	<p>1. To help students develop clear understanding of key concepts in classical and contemporary sociology and how these concepts relate to some of the perennial themes in the discipline</p> <p>2. To develop an appreciation of the link between sociological theory and practice</p>

				3. To help students master the art of explaining abstract material in clear, precise ways that can be easily understood even by a lay man
8.	MASO -202	Social Demography	2018	<ol style="list-style-type: none"> 1. To introduce the significance of population and its relation to society 2. To provide a theoretical knowledge of the basic concepts of population and changes 3. To enable the students to realize impact of population , changing global scenario, awareness on population control devices and analyse prospects
9.	MASO -203	Rural Sociology and Development	2018	<ol style="list-style-type: none"> 1. This course is to help the students to understand the difference between urban and rural development 2. To analyse the dynamics of rural Indian society in the context of its socio, political and economic contradictions 3. To evaluate the problems related to development in relation to the needs and aspirations of the marginalized sections
10.	MASO -204	Extension Work	2018	<ol style="list-style-type: none"> 1. This paper expose the students to apply sociological theories and principles in field areas 2. To give direct experience of social institutions and social problems through field work 3. To train for creative and innovative experiences in social field using research techniques
11	MASO -205	Environmental Sociology	2018	<ol style="list-style-type: none"> 1. This paper aims to provide the students with a comprehensive conceptual, theoretical and empirical backgrounds of interaction between

				<p>Social world and Nature</p> <ol style="list-style-type: none"> 2. To explore the relationship between human society and the larger natural environment 3. To prepare the students for further research in broad areas of environment and natural resource governance from sociological perspective
12	MASO -206	Human Values and Professional Ethics-II	2018	<ol style="list-style-type: none"> 1. To provide knowledge about Value oriented education, Medical ethics, Family values , Ethics and Moral code 2. To provide the Business, Environmental and social ethics followed and practiced 3. To enhance values of self-esteem and self-respect among students
13	MASO -301	Medical Sociology	2018	<ol style="list-style-type: none"> 1. This course will help the students to understand the concepts of health and illness 2. To understand the social facts of health and the root causes of illness 3. To apply sociological theories, concepts, and research to experiences of health, illness, health education, public health and the intense public issues related to health
14	MASO -302	Urban Sociology and Development	2018	<ol style="list-style-type: none"> 1. This paper attempts to analyse the urban social world and its dynamics, various theoretical constructs concerning the patterning and growth of towns and cities 2. To understand the various theoretical approaches to urban development and apply them to different aspects of cities 3. To study historical, economic, and political trends that have affected the growth and

				development of cities
15	MASO -303	Field Work and Extension (Village placement)	2018	<ol style="list-style-type: none"> 1. This paper aims at direct exposure of students to the real world and problems confronting society 2. Students will carry out field work in village for 10 days for practical experience 3. To learn about sociological study techniques like Participatory Rural Appraisal, Sampling, Interview and Extension
16	MASO 304	Generic electives (a) Human Rights	2018	<ol style="list-style-type: none"> 1. To study Human rights and Constitutional framework 2. To recognize the role of human rights in development, theories of development, development and tradeoff on human rights 3. To Understand the social, political, cultural, and comparative construction of human rights history , institutions, discourses, and futures
		(b) Sociology of Gender	2018	<ol style="list-style-type: none"> 1. To examine how society influences understandings and perception of differences between masculinity (what society deems appropriate behaviour for a “man”) and femininity (what society deems appropriate behaviour for a “woman”). 2. To understand influences of gender on identity and social practices. 3. To pay special focus on the power relationships that follow from the established genderorder in a given society and changes over time.
		c) Gerontology	2018	<ol style="list-style-type: none"> 1. This paper aims at understanding physical, psychosocial, and cultural aspects of the aged 2. To understand aging transitions and

				<p>intergenerational issues at various contexts and its nexus</p> <p>3. To examine health and illness adjusting to loss and care of persons with chronic illnesses and rehabilitative needs</p>
		(d) Sociology of Andhra Pradesh	2018	<p>1. This paper aims to study the historical outline and emergence of Andhra society</p> <p>2. To understand the culture and various social movements in Andhra Pradesh</p> <p>3. To analyze the welfare and developmental programmes of the rural and urban Andhra Pradesh</p>
17	MASO -305	Open elective (a) Social Psychology and Personality Development	2018	<p>1. This paper aims at the understanding the relationship of cognition and attitudes of individual and society</p> <p>2. To focus on psychological aspects of the individual in the context of social behaviour</p> <p>3. To examine group dynamics such as group thinking and decision making, leadership, persuasion, conflict and cooperation)</p>
		(b) Business And Society	2018	<p>1. This paper aims at understanding the concepts of Social economy and knowledge management</p> <p>2. To examine the business community and social responsibility</p> <p>3. To understand the inter-relation among business firms, organizations , public policy, business law and governance</p>
23	MASO -401	Criminology	2018	<p>1. This paper seeks to describe the students about the different types of crime and scope of criminology</p>

				<ol style="list-style-type: none"> 2. To illustrate the causes of crime and crime rates 3. To study the crime scientifically through data on crime, trends and various theoretical approaches
24	MASO-402	Industrial Dynamics	2018	<ol style="list-style-type: none"> 1. This paper aims to provide the students about the structure and process of industrial organizations from sociological perspective 2. To deal with the effects of industrialization on Indian social systems and institutions 3. To study the internal relations which are connected directly or indirectly with industry
25	MASO-403	Field Work	2018	<ol style="list-style-type: none"> 1. This paper aims at exposing students in analysing the data 2. To understand the different variations in viva-voce 3. To understand the recent patterns in Practice
26	MASO-404	Generic electives (a) Social Welfare and Welfare Administration	2018	<ol style="list-style-type: none"> 1. This paper aims at understanding the efficiency of resources and services to meet the needs of the individuals, families, groups and communities 2. To understand the problems of Schedule castes, Schedule tribes, Backward classes and Minorities 3. To facilitate social relationship and adjustments necessary for the disadvantaged sections, children, women, youth and elderly
		(b) Social Entrepreneurship Development	2018	<ol style="list-style-type: none"> 1. The aim of this paper is to understand the theoretical positions of the Social entrepreneurship development

				<ol style="list-style-type: none"> 2. To be aware of the contemporary approaches to social entrepreneurship 3. To have comprehensive understanding of the context, process and effects of entrepreneurial activities
		(c) Sociological Perspectives	2018	<ol style="list-style-type: none"> 1. This paper aims at the students to compare and contrast basic theoretical perspectives of sociology through rigorous scientific enterprise 2. To sensitize the need for empirically grounded theories 3. To acquaint students with the recent trends in Sociological thought
		(d) Globalization and society	2018	<ol style="list-style-type: none"> 1. This paper aims at the students to understand the nature and dynamics of globalization and social context though various agencies 2. To analyze the interconnected changes in the economic, cultural, social, and political spheres of society 3. To understand ever-increasing integration of nations, regions, communities
27	MASO-405	Open elective (a) Globalization and Educational Pursuits	2018	<ol style="list-style-type: none"> 1. This paper aims to understand multifaceted nature of globalization and internationalization in the context of higher education 2. To examine key concepts and theories of globalization, international and comparative education 3. To make the students understand the Global citizenship from professional and academic

				perspective
		(b) Visual Sociology	2018	<ol style="list-style-type: none"> 1. This paper aims at providing the students a new perspective in study of deliberate versus spontaneous behavior 2. To be aware of recording social signals, expressions as spontaneous as possible 3. To organize the recording of reactions and variations that occur as a response to the context

25. Tamil

S.No	Course Code	Name of the Course	year introduction	of Course Outcomes
1.	TML 101	Modern Literature – I	2018	<p>The students will be able to know the latest trends in the Tamil literature</p> <p>The students will gain complete knowledge about contemporary Tamil language and its usage.</p>
2.	TML 102	Medieval Literature- I	2018	<p>Students will gain knowledge about the various aspects of medieval Tamil literature</p> <p>Students will learn about the History of Medieval Tamil culture through literature</p>
3.	TML 103	Grammar - I	2018	<ol style="list-style-type: none"> 1. Students will acquire basic knowledge in Tamil Grammar 2. Students will be able to use the language in a structured manner as per the rules of the grammar

4.	TML 104	Principle of Literary Criticism - I	2018	<p>1. This subject will help students become a responsible critic offering constructive criticism rather than abusing literary criticism</p> <p>2. Students will be able to contribute to the development of Tamil literature through quality criticism.</p>
5.	TML 105	History of Tamil Literature - I	2018	<p>1. Students will understand the richness of Tamil literature by studying the great works of sangam age</p> <p>2. Students will know the contribution of Buddhists, Jains, Pallavas, Cholas etc., to the evolution of Tamil literature</p>
6.	TML 106	Human Values and Professional Ethics - I	2018	<p>1. Value based education will help the student to act with responsibility in the social environment</p> <p>2. Helps the student to act with Ethics and create awareness among the public.</p>
7.	TML 201	Modern Literature - II	2018	<p>1. Students will know the latest works, contemporary writing style and better equipped to emulate and produce better works</p> <p>2. Students will understand and appreciate the contribution of contemporary writers to Tamil literature</p>
8.	TML 202	Medieval Literature - II	2018	<p>1. Students will acquire knowledge about Prosody (Yappu)</p> <p>2. Students will be able to use the language in a structured manner as per the rules of the grammar</p>

9.	TML 203	Grammar - II	2018	<p>1. Students will understand the importance of saving the environment from adverse changes that is happening currently.</p> <p>2. Students will adapt environment friendly practices in their day to day life to minimize the impact of human activities on nature</p>
10.	TML 204	(a)Environment in Tamil Literature (b) Feminism	2018	<p>1. Students will understand the rights of women in the society and treat them equally with respect and dignity</p> <p>2. Students will gain right knowledge about feminism and contribute to the development of gender equality through literature as well as in their daily lives.</p>
11.	TML 205	History of Tamil Literature-II	2018	<p>1. Students will understand the evolution of Tamil language and its literature over different time periods.</p> <p>2. By studying this subject, Students will be able to learn about the Tamil culture of the past and how it has evolved over generations.</p>
12.	TML 206	Human Values and Professional Ethics -II	2018	<p>1. Value based education will help the student to act with responsibility in the social environment</p> <p>2. Helps the student to act with Ethics and create awareness among the public</p>
13.	TML -301	Ancient Literature - I	2018	<p>1. Students will learn about the works pertaining to Sangam age</p> <p>2. Students will be able to appreciate the contribution of the ancient age authors to the evolution of Tamil language</p>

14.	TML -302	Grammar - III	2018	<p>1. Students will have a better understanding of grammatical usage in Tamil literature</p> <p>2. Students will be able to use the language in a structured manner as per the rules of the grammar</p>
15.	TML -303	General Linguistics	2018	<p>1. Students will gain knowledge about various languages and basis on which they are classified</p> <p>2. Students will have good understanding about the concepts of Linguistics, Phonetics, Phonemics etc.,</p>
16.	TML -304-A	Comparative study of South Indian Literature - I	2018	<p>1. Students will learn about the early literature in south Indian languages and the influence they had on each other</p> <p>2. Students will learn about the Sanskrit classics that were translated into south Indian languages</p>
17.	TML -304-B	Dravidian Movement In Tamil Literature	2018	<p>1. Students will learn about the history of Dravidian movements, its proponents and its contribution to the betterment of the society</p> <p>2. Students will understand the positive impact that the Dravidian movement has created on the Tamil society and its development</p>
18.	TML -304-C	Telugu Literature & Literary Movements	2018	<p>1. Students will learn about the evolution of Telugu literature by studying various prominent literary works of different ages</p> <p>2. Students will be better equipped to do comparative study of Tamil language with that of another Dravidian language i.e. Telugu</p>

19.	TML -304-D	Folk Arts in Tamil	2018	<p>1. Students will learn about the various Folk arts and the Tamil culture in a detailed manner</p> <p>2. Students will appreciate the role of Folk arts in preserving, sustaining and evolution of Tamil culture.</p>
20.	TML -305-A	Temples of Tamil Nadu	2018	<p>1. Students will gain in-depth knowledge about various Hindu temples situated in the state of Tamil Nadu</p> <p>2. Students will understand the meaning, origin and history of various religious practices that take place in temples</p>
21.	TML -305-B	Tamil Culture	2018	<p>1. Students will gain knowledge about various aspects of Tamil culture and its history</p> <p>2. Students will understand the evolution of Tamil culture over different time periods.</p>
22.	TML-401	Ancient Literature - II	2018	<p>1. Students will learn about the ancient Tamil literature works like Agananooru, Purananooru etc.,</p> <p>2. Students will be able to appreciate the contribution of the ancient age authors to the evolution of Tamil language</p>
23.	TML-402	Grammar - IV	2018	<p>1. Students will have a better understanding of poetics in Tamil literature</p> <p>2. Students will be able to use the language in a structured manner as per the rules of the grammar</p>

24.	TML-403	Comparative grammar of Dravidian Languages and History of Tamil Language	2018	<p>1. Students will understand the important characteristic features of Grammar of Dravidian languages through a comparative study</p> <p>2. Students will gain knowledge about the grammatical aspects of various languages and the mutual borrowing of words between Tamil language and other languages.</p>
25.	TML-404-A	Comparative study of South Indian Literature - II	2018	<p>1. Students will understand and appreciate the influence of various movements and contribution of Islam and Christian poets to Dravidian languages</p> <p>2. Students will learn about the major literary movements in the history.</p>
26.	TML-404-B	Research Methodology	2018	<p>1. Students will understand the methodology, approach and the prominence of a quality research</p> <p>2. Students will be motivated to take up research and produce quality outcomes</p>
27.	TML-404-C	Tirukkural (Porutpal)	2018	<p>1. Students will gain immense knowledge and wisdom by studying the profound teachings of Saint Tiruvalluvar</p> <p>2. Students will have a new perspective towards politics, education, life and the world in general after studying the wise teachings of Tiruvalluvar.</p>
28.	TML-404-D	Folk Festivals	2018	<p>1. Students will learn about various types of folk festivals and the way of their celebrations.</p> <p>2. Students will gain substantial knowledge about the nitty gritty of folk festivals of different religions</p>

29.	TML-405-A	Cilappathikaram (Madhurai kadam)	2018	1.Students will gain knowledge about the most prominent chapter of the First Epic in Tamil i.e. Maduraikantam 2.Students will be motivated to study the first Epic in Tamil in its entirety
30.	TML-405-B	Panneru (12) Alvargal	2018	1. Students will gain knowledge about the Tamil Alvars and their contribution to the Tamil literature 2. Students will be well equipped to understand the magnificent literary works of Tamil Alvars.

26. Telugu Studies

27. Urdu

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
31.	URD 101	Mubadiyat-e- Lisaniyat aur Tareeq-e –Zaban-e- Urdu	2018	Course Outcomes: (1) Knowledge of history of basic Urdu Language. (2) Awareness about ancient and modern Indo-Aryan languages.
32.	URD 102	Dakniyat	2018	Out come (1) Student understands the brief history of Dakani Literature. (2) Student will be able to analyses the writings of Mohd Quli Qutub Shah. (3) Student will learn about the classical genres of Dakani

33.	URD 103	Classiki Nasr	2018	<p>Course Outcomes:</p> <p>(1) Student will be able to understand the early Urdu poetry of Northern India.</p> <p>(2) Understanding the different forms of Urdu Poetry and poets.</p>
34.	URD 104	Arabi Zaban-o-Adab	2018	<p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of humor and satire in Urdu literature.</p> <p>(2) Differentiate between satire and humor in text.</p> <p>(3) Analyze the text and identify the elements of satire and</p>
35.	URD 105	Fanne Sher aur Jadeed Asnafa Shairi	2018	<p>Course Outcomes:</p> <p>(1) Able to read, write and understand simple Arabic sentences.</p> <p>(2) Translate simple Arabic sentences.</p> <p>(3) Student will gain brief awareness of Arabic literature</p> <p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of Urdu Qaseeda from Dakani period.</p> <p>(2) Differentiate between the Dakani and Urdu Qaseeda with respect of language, diction and style</p> <p>(3) Understand the salient features of Urdu Qaseeda with special reference to Nusrati, Sauda and Zauq.</p> <p>Course Outcomes:</p> <p>(1) Knowledge about the tradition of Urdu Marsiya.</p>
36.	URD 106	Human Values and Professional Ethics – I	2018	<p>Course Outcomes:</p> <p>(1) Knowledge about tradition of Urdu Drama.</p> <p>(2) Distinguish various forms and techniques of Urdu Drama.</p> <p>(3) Analyses critically the text of Anar kali and Inder Sabha.</p> <p>Course Outcomes:</p> <p>(1) The student would enrich the knowledge about the Urdu poets and writers of Andhra Pradesh and Tamil Nadu.</p> <p>(2) Would understand the features of regional Urdu poets and</p>

37.	URD 107		2018	Course Outcomes: (1) Understand, What are the Human Values accepted globally. (2) Knowing the importance of Human Values in religious scriptures and philosophies.
38.	URD 201	Rayalaseema ka Sher-o-Adab	2018	Course Outcomes: (1) Have learn about the important historical events of Urdu Poetry. (2) Have knowledge about the most important schools of
39.	URD 202	Classiki Shairi	2018	Out come (1) Student understands the brief history of Dakani Literature. (2) Student will be able to analyze the writings of Mohd Quli Qutub Shah. (3) Student will learn about the classical genres of Dakani literature.
40.	URD 203	Hali : Hayat aur Adabi Khidmat	2018	Out come (1) Student will know about the classics of Urdu prose. (2) Student will be able to read and understand the text. (3) Student will learn critical awareness of the text.
41.	URD 204	Farsi Zaban-o-Adab	2018	Out come (1) Student will know about the classics of Urdu prose. (2) Student will be able to read and understand the text. (3) Student will learn critical awareness of the text.

42.	URD 205	Ghair Afsanavi Adab	2018	<p>Course Outcomes:</p> <p>(1) Student will be able to read, write and understand simple persian sentences.</p> <p>(2) Acquire Knowledge about the Persian poetic writings of Sa'di, Hafiz and Iqbal.</p> <p>(3) Student will gain brief awareness of Persian literature.</p> <p>Course Outcomes:</p> <p>(1) Specialized in the life and contributions of Faiz Ahmed Faiz.</p> <p>(2) Identify the uniqueness of the poetry of Faiz Ahmed Faiz.</p> <p>(3) Understanding the salient features of the poetry of Faiz Ahmed Faiz.</p> <p>Course Outcomes:</p> <p>(1) Specialized in the life and contributions of</p>
43.	URD 206 206	Human Values and Professional Ethics –II	2018	<p>Course Outcomes:</p> <p>(1) Awareness of literature written in Rayalaseema.</p> <p>(2) Understand the style of new poets of this region.</p> <p>(3) Gain knowledge about two of the pominent prose writers of this area</p> <p>Course Outcomes:</p> <p>(1) Apply the skills of Ilm e bayan and identifying the phrases in poetry.</p>
44.	URD 207		2018	<p>Course Outcomes:</p> <p>(1) Awareness about Professional Ehics and its categorization.</p> <p>(2) Understand the importance of Professional Ethics in society.</p> <p>(3) Develop a feeling to become a responsible citizen and a</p>
45.	URD 301	Jadeed Nasr	2018	<p>Course Outcomes:</p> <p>(1) Knowledge about the forms and tradition of Urdu Ghazal.</p> <p>(2) Understanding Dakani Ghazal with reference to eminent Dakani poets.</p> <p>(3) Understanding Classiki Ghazal and Jadeed Ghazal with</p>

46.	URD 302	Jadeed Nazm	2018	<p>Out comes</p> <p>(1) Understanding the forms of Urdu Nazm. (2) Critically estimate and explain the art and technique of famous Urdu poets. (3) Knowledge about the distinctive features Urdu Nazm</p>
47.	URD 303	Urdu Tanqeed	2018	<p>Out come</p> <p>(1) The learner would understand about the mile stones of Urdu Novel. (2) The learner would understand the technical features of Urdu Novel. (3) The learner would understand about the Urdu Novel writers.</p> <p>Out come</p> <p>(1) Knowledge about tradition of Urdu Afsana. (2) Awareness of literary trends and its impact on Urdu Afsana. (3) Identifying and distinguishing the elements in Urdu Afsana</p> <p>Course Outcomes:</p> <p>(1) The learner would understand about the history of computer.</p>
48.	URD 304 A URD 304 B URD 304 C URD 304 D	(a) Sir Syed ka Khusoosi Mutalea (b) Iqbal ka Khusoosi Mutalea (c) Faiz ka Khusoosi Mutalea	2018	<p>Course Outcomes:</p> <p>(1) The learner will know about the aims and objectives of the Journalism. (2) Distinguish between writings of news paper, radio and television. (3) The learner will know about the different fields of Urdu journalism.</p>

49.	URD 305 A URD 305 B URD 305 C	(a) Urdu Ghazal (b) Jadeed Dakani Shairi (c) Urdu Afsana	2018	<p>Course Outcomes:</p> <p>(1) Knowledge about Jadeed Dakani Shairi. (2) Understand Jadeed Dakani Shairi and its vocabulary and diction. (3) Critical awareness about 5 eminent poets of Jadeed Dakani.</p> <p>Course Outcomes:</p> <p>(1) Knowledge about types, techniques and issues of translation. (2) Distinguish between various types of translations.</p>
50.	URD 401	Urdu Drama	2018	<p>Course Outcomes:</p> <p>(1) Knowledge of Basic Linguistics. (2) Awareness about ancient and modern Indo-Aryan languages. (3) Command over origin and evolution of Urdu language</p>
51.	URD 402	Adabi Tehreekat aur Rujhanat	2018	<p>Out comes</p> <p>(1) Knowledge about research, types of research and method of research. (2) Distinguish between various types of research writings. (3) Capable for selection of topic, material collection, designing the research work and writing research paper</p>

52.	URD 403	Tanz –o- Mizah	2018	<p>Out come</p> <p>(1) Knowledge about Literary criticism. (2) Vies and contributions of Hali and Shibli on literary criticism. (3) Understanding 6 schools of literary criticism.</p> <p>Out come</p> <p>(1) Understand the tradition of Ghari Afsanavi Adab and its salient features. (2) Literary importance of Maktoob Nigare and Inshaiya. (3) Literary importance of Khaka and Safarnama.</p> <p>Course Outcomes:</p> <p>(1) Understand the literary contributions of Altaf Husain Hali. (2) Importance and salient features of Mussadas, Muqaddama & Maqalat. (3) Understand the writing style of Hali as a biographer</p> <p>Course Outcomes:</p> <p>(1) Knowledge about form and tradition of Urdu Ghazal.</p>
53.	URD 404 A URD 404 B URD 404 C URD 404 D	(a) Urdu Tarjuma Nigari (b) Urdu Marsiya (c) Urdu Khudnavisht	2018	<p>Outcomes:</p> <p>(1) Able to know the history and trends of Telugu, Hindi and English languages. (2) Gain the comparative knowledge of various languages and their literature</p>
54.	URD 405 A URD 405 B URD 405 C	(a) Ibtdayi Urdu (b) Tehqeeq - Tariqekar (c) Urdu Qaseeda	2018	<p>Course Outcomes:</p> <p>(1) Specialized in the contributions of Sir Syed Ahmed Khan. (2) Contributions of Sir Syed Ahmed Khan, as literary person and as a educationist. (3) Understanding the contributions of his literary friends</p> <p>Course Outcomes:</p> <p>(1) Specialized in the contributions of Sir Mohammed Iqbal. (2) Contributions of Allama Iqbal with reference to Bal e Jibreel.</p>

S.V.U. College of Sciences

28. Anthropology

S. No.	Name of the Programme	Course Code	Title of the Course	Years	Course Outcomes
1	M.Sc. Anthropology	ANO : 101	Introduction to Social Cultural Anthropology	2018	<ul style="list-style-type: none"> a. Exposed to the basic introductory background about Socio-cultural Anthropology, its historical background and relation to other branches b. Provides knowledge about the entire subject matter of the socio-cultural anthropology as well as its different sub-branches. c. Exposed to social institutions d. Know the religion beliefs, rituals and myth
2	M.Sc. Anthropology	ANO : 102	Introduction to Biological Anthropology	2018	<ul style="list-style-type: none"> a. Exposed to the basic concept, meaning and scope of Biological Anthropology b. Explain how human being acts as the central figure of Anthropology c. Elucidate the major divisions of Biological/ physical Anthropology d. Know the inter-relationship between Biological Anthropology and other sciences e. To know how Man evolved in animal kingdom f. To understand how evolution has occurred and what are the evidences

					of evolution and addresses human variation and the causes of variations
3	M.Sc. Anthropology	ANO-103	Introduction to Archaeological Anthropology	2018	<ul style="list-style-type: none"> a. Able to define archaeological anthropology and its branches b. Understand the geological timescale, tool typology and technology c. The Course will explain the basic concepts and terminology used in prehistoric archaeology d. Understand chronological and cultural determinants of Indian and European prehistory
4	M.Sc. Anthropology	ANO-104P	Somatometry & Somatoscopy	2018	
5	M.Sc. Anthropology	ANO 105p	Archaeological Anthropology	2018	
6.	M.Sc. Anthropology	ANO 106	Economic and Political Anthropology	2018	<ul style="list-style-type: none"> a. Able to learn meaning and scope of economic anthropology b. To understand the division of labor by gender and age, exchange of goods and gifts, and to understand the market economy. c. Able to know the historical background of Political Organization besides types and trends of Political Organization including types like i.e. Band, Tribe, Chiefdoms and State d. To know the local institutions: panchayats (traditional and statutory)

7.	M.Sc. Anthropology	ANO 107	Human Values and Professional Ethics -1	2018	
8.	M.Sc. Anthropology	ANO 201	Comparative Ethnography and Indian Anthropology	2018	<ul style="list-style-type: none"> a. To understand the major ethnological regions of the world b. To know the ethnic and linguistic classifications c. Able to understand the traditional Indian culture d. To know the contributions of Indian anthropologists
9.	M.Sc. Anthropology	ANO 202	Principals of Genetics	2018	<ul style="list-style-type: none"> a. understand about the scope of genetics and its historical development b. to learn the biology of cell and cell division c. Exposed to the patterns of the inheritance d. Know about blood groups and their anthropological perspective
10	M.Sc. Anthropology	ANO 203	Research Methods in Anthropology	2018	<ul style="list-style-type: none"> a. To understand the fieldwork traditions in Anthropology b. To understand the concept of research and its purpose c. highlight the conceptual structure of a research design d. understand the various statistical tools in the analysis and interpretation of the data
11	M.Sc. Anthropology	ANO 204P	Craniology and Craniometry	2018	
12	M.Sc. Anthropology	ANO205P	Doing Ethnography	2018	
13	M.Sc. Anthropology	ANO206	Prehistoric India	2018	<ul style="list-style-type: none"> a. learn the regional distribution of

					<p>lower, middle, and upper Paleolithic cultures</p> <p>b. To learn the Mesolithic culture and typo- technology</p> <p>c. Learn the regional distributions of Neolithic cultures</p> <p>d. understand the copper and iron age</p> <p>e. exposed to the distribution of megaliths</p>
14	M.Sc. Anthropology	ANO 207	Human Values and Professional Ethics -II	2018	
15	M.Sc. Anthropology	ANB 301	Human Evolution and Fossil Evidence	2018	<p>a. Understand the evolutionary trends of primates, prosimians to homosapiens</p> <p>b. To know the hominid evolution</p> <p>c. To know the Neanderthals distributions and extension</p> <p>d. Exposed to the homo sapiens distribution and feature of human species</p>
16	M.Sc. Anthropology	ANB 302	Human Genetics	2018	<p>a. understand the meaning and scope of human genetics</p> <p>b. know methods of studying human chromosomes and chromosomal abnormalities</p> <p>c. depict Inborn errors of metabolism with typical examples and human human ABO blood group system and its fundamentals</p> <p>d. know the concept of “one-gene-one-enzyme hypothesis” which explains</p>

					development of genetic diseases/disorders caused by defective genes controlling the functions of enzymes in metabolic pathways
17	M.Sc. Anthropology	ANB 303P	Human Osteology and Osteometry	2018	
18	M.Sc. Anthropology	ANB 304P	Dermatoglyphics	2018	
19	M.Sc. Anthropology	ANB 305	Anthropological Demography	2018	<ul style="list-style-type: none"> a. Know about the different population growth theories b. Learn the basic demographic variables c. Understand how the different factors regulates the population growth d. Understand the different demographic models e. Learn the genetic consequences of family planning
20	M.Sc. Anthropology	ANB 306	Biostatistics and Computer Applications	2018	<ul style="list-style-type: none"> a. To understand the concept of research and its purpose b. To enlighten the process of research and conceptual structure of a research design c. Understand the disease outcomes through measurement of descriptive, analysis of variance and regression models through computer applications d. Know the use of computers in the analysis data and power point presentation
21	M.Sc. Anthropology	ANB 307	Forensic Anthropology	2018	<ul style="list-style-type: none"> a. able to know about forensic anthropology, a specialized, applied

					<p>branch of physical/biological anthropology which deals with the crime investigation</p> <ul style="list-style-type: none"> b. understand how dermatoglyphic, somatoscopic characteristics and body fluids helpful in crime investigation c. know the use of skeletal remains in forensic investigations d. know the importance of modern methods in crime investigation
22	M.Sc. Anthropology	ANB 308	Palaeoanthropology	2018	<ul style="list-style-type: none"> a. understand the geological time scale and Pleistocene epoch b. know about tool making techniques and tool types c. gain knowledge about dating methods d. learn about Paleolithic, Mesolithic and Neolithic cultures in India
23	M.Sc. Anthropology	ANB 401	Biological Anthropology	2018	<ul style="list-style-type: none"> a. Understand the basic concept, meaning and scope of Biological Anthropology b. Know the biological variation in modern human populations c. Understand the human adaptability and impact of urbanization on humans d. Bio-cultural aspects of health and disease
24	M.Sc. Anthropology	ANB-402	Human Population Genetics	2018	Students will

					<ul style="list-style-type: none"> a. Explain the basic terms/concepts of human population genetics b. Appreciate the mechanisms of evolutionary forces in shaping biological diversity c. Understand the importance of Hardy – Weinberg Equilibrium especially the gene frequency changes with respect to Mutation, Genetic drift, Selection, Gene flow and to investigate them in empirical situations in human populations d. Know about breeding isolation and its implications in human population genetics. e. Understand various mating patterns (inbreeding and types of consanguineous marriages) and measure the inbreeding in families
27	M.Sc. Anthropology	ANB -405	Human Growth, Physique and Nutrition	2018	<ul style="list-style-type: none"> a. Know about the Differentiate the term growth, maturation and development b. To learn the methods of studying growth and the factors affecting the growth c. To understand the Human Physique and its Relation of Function, Disease and Behavior. d. Know the socio-cultural aspects of nutrition and nutrients in health and diseases
28	M.Sc. Anthropology	ANB 406	Applied Biological	2018	<ul style="list-style-type: none"> a. Know about various applications of

			Anthropology		<p>anthropometry and kinanthropometry in various fields</p> <p>b. Understand about the importance of forensic anthropology in crime investigations</p> <p>c. Know the importance genetic counseling, genetic screening, Genetic engineering, treatment of genetic diseases and Gene therapy</p> <p>d. Learn about the human geno project</p>
29	M.Sc. Anthropology	ANB 407	Medical Genetics	2018	<p>a. Understand the overplanting areas of anthropology and genetics, anthropology and medicine (Disease)</p> <p>b. Understand the different methods of identification genetic diseases</p> <p>c. Know about epidemiology, socio cultural and ecological dimensions of genetic diseases control and treatment</p> <p>d. Learn the knowledge, attitude and currying practices of genetic diseases</p>
30	M.Sc. Anthropology	ANB-408	Epidemiology	2018	<p>a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health.</p> <p>b. Understand the global burden of health outcomes and diseases by assessing measures and interpret the prevalence, risk, rate, and odds within the context of epidemiology</p>

					<ul style="list-style-type: none"> c. Know about Complications of obesity on health its prevention and control d. Understand the complex web of biological, behavioral, cultural and environmental factors towards the prevalence of communicable infections and chronic infections
31	M.Sc. Anthropology	ANB -409	Applied Anthropology	2018	<ul style="list-style-type: none"> a. Know about various applications of anthropometry and kinanthropometry in various fields b. Understand about the importance of anthropology in crime investigations c. Understand about the importance of biological anthropology in study of various diseases
32	M.Sc. Anthropology	ANS 301	Theories of Culture	2018	<ul style="list-style-type: none"> a. Understand the Conceptual Contributions of E. B. Tylor, B. Malinowski, A. L. Kroeber, L. White, Unilineal Evolution (L. H. Morgan and E. B. Tylor); Multilineal Evolution (J. Steward); Universal Evolution (L. White) b. To know the British School; German-Austrian School; American – Distribution School of culture c. Know the Patterns of Culture (R. Benedict); Basic Personality, Model Personality (Kardiner, Linton, Cora Dubois); Selfhood (Murphy); Symbolic (G. Obeyesekere)

					d. understand the historical approaches of culture
33	M.Sc. Anthropology	ANS 302	Social Anthropology of Complex Societies	2018	<ul style="list-style-type: none"> a. Learn the meaning and approach of great and little traditions b. learn about the peasant societies and contemporary peasant societies c. know the culture of poverty, institution and complex societies d. understand problems of urbanization and social changes
36	M.Sc. Anthropology	ANS 305	Ecological Anthropology	2018	<ul style="list-style-type: none"> a. Understand the environment and ecosystem in understanding the cultural modifications b. Know about the cultural ecology, cognitive ecology, single unified ecology, and ethno ecology. c. Learn issues and prospects on development projects and displacement d. Understand Biodiversity for sustainable development Knowabout Ecological protest movements (Chipko and Narmada Bachao Andolan (NBA));
37	M.Sc. Anthropology	ANS 306	Applied Anthropology- Indigenous Communities	2018	<ul style="list-style-type: none"> a. Know the Similarities and Differences between Applied and Action Anthropology, Indigenous communities and applied anthropology. Indigenous rights. b. Know the process of acculturation and assimilation, socialization c. Know about applications of

					<p>Anthropology in the management of health, agriculture, education and biodiversity and poverty eradication</p> <p>d. Gain the knowledge on tribal welfare, tribal problems, forest and property rights, shifting cultivation and tribal movements</p>
38	M.Sc. Anthropology	ANS 307	Anthropology of Religion Sacred complexes in India	2018	<p>a. Know about meaning and relation with power and political leverages, ethnic identity and other aspects of culture in tradition and modern societies</p> <p>b. Know the different anthropological theories of religion</p> <p>c. Know the issues of right of food among by Hindus, five symbols of sikh identity, Aspects of sarora ritual and Shamansism, and Christianity in India</p> <p>d. To understand Contemporary issues of religious violence, secularism and fundamentalism</p>
39	M.Sc. Anthropology	ANS 308	Anthropology and Career Promotion	2018	<p>a. Understand the anthropology in competitive examinations</p> <p>b. Know about participatory research appraisal</p> <p>c. Exposed to the issues in tribes, tribal problems and cast populations</p> <p>d. Learn the books to be consulted, review of questions and scheme of valuation</p>

40	M.Sc. Anthropology	ANS 401	Structural Anthropology	2018	<ul style="list-style-type: none"> a. Know the social structure and function of culture b. Understand about the ideal and real social structure and social organization c. Know the general notion of structuralism d. Learn the symbols and structure
41	M.Sc. Anthropology	ANS-402	Medical Anthropology	2018	<ul style="list-style-type: none"> a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health. b. Understand the etiology, control of infections and non-infections diseases c. Understand the ethno-medicine in the management of health and illness behavior d. Understand the modern medical systems and health care delivery services
44	M.Sc. Anthropology	ANS -405	Developmental Anthropology	2018	<ul style="list-style-type: none"> a. Know about the Concept of Development and Sustainable Development b. Understand the steps in project preparation, goals, process of implementation and monitoring. c. Role of government, NGOs and peoples participation in development

					d. Know the watershed management and irrigation, resettlement,(Narmada) poverty Alleviation (Velugu); Primary Education (VECs
45	M.Sc. Anthropology	ANS 406	Culture and Management	2018	<ul style="list-style-type: none"> a. Know the concept of organizational culture. Its links with cultural anthropology Organizational ethnography. Anthropology of work b. Understand the Theories of organizational culture. Different anthropological traditions c. Know the How culture affect management Changes in management styles Future outlook. d. To understand the Ethno methodological approaches, Organizational symbolism. Integration, differentiation and fragmentation as three perspective approaches to organizational culture
46	M.Sc. Anthropology	ANS 407	Anthropology of Displaced Populations	2018	<ul style="list-style-type: none"> a. Know the peoples perception towards development and displacement b. Understand the role of government and non-government agencies in the process of displacement, resettlement and rehabilitation. c. Understand policy issues relating development and displacement in legal implications of displacement and rehabilitation d. Learn the Socio-Cultural effects of displacement, Socio disorganization, process of disintegration and

					reintegration
47	M.Sc. Anthropology	ANS-408	Visual Anthropology	2018	<ul style="list-style-type: none"> a. Know about the concept, scope and Historical Development of visual anthropology b. Know about the appraisal of ethnographic films in cultural context c. Knowledge about descriptive studying of Visual data produced by Cultures d. To understand the ethnographical films, still photos film shootings and commentary
48	M.Sc. Anthropology	ANS -409	Environmental Anthropology	2018	<ul style="list-style-type: none"> a. Know the meaning and scope ecosystem of homeostases, ecological niche and ecosystem development b. Understand the various theoretical formulations c. Understand Biodiversity for Sustainable Development; Development Projects (Hydro-electric, Irrigation Projects and Industries) and Displacement. d. Exposed to the different ecological issues and environmentalism towards development

29. Biochemistry

S.No.	Course Code	Name of the Course	Year of	Course Outcomes
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			introduction	
1	BCH101	Biochemical and Biophysical methods	2018	<ol style="list-style-type: none"> 1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research. 2. Learn about basic Radioactivity principles, measurement method and its biological applications. 3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields. 4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques
2	BCH 102	Molecular Physiology and community nutrition	2018	<ol style="list-style-type: none"> 1. Gain the knowledge about circulatory and excretory systems. 2. Know the importance of muscular and nervous system. 3. Health benefits and malnutrition of proteins and fats. 4. Know the importance of nutrition in maintenance of health and diseases.
3	BCH 103P	Practical related to Biochemical Preparations and Analysis	2018	<ol style="list-style-type: none"> 1. Learn safety and precautionary measures for working in a laboratory. 2. Develop skill and proficiency in preparation of laboratory reagents and Use of handling of glass wares, minor equipment for conducting experiments 3. Acquire practical training for qualitative and quantitative analysis of biological

				<p>materials/molecules and their estimation using multiple methods.</p> <p>4. Gain the knowledge about isolation studies of biological samples.</p>
4	BCH 104P	PracticalrelatedtoAnalyticalmethods	2018	<ol style="list-style-type: none"> 1. Learn how to standardize various biomolecules. 2. Separate biomolecules by paper chromatography and thin layer chromatography 3. Demonstrate separation of protein by electrophoresis. 4. Isolation and spectrophotometric characterization of plant pigments.
5	BCH 105P	HumanvaluesandProfessionalethics-I	2018	<ol style="list-style-type: none"> 1. Easily understand the Need and Importance of Professional Ethics- Goals- Ethical Values in various Professions. 2. Analyse the basic moral concepts- right , ought, duty, obligation, justice, responsibility and freedom. 3. Know about Purusharthas, Dharma, Artha, Kama, Moksha. 4. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavratasandanuvratas 5. Gain the knowledge about views on Manu and Yajnavalkya
6	BCH 106	CellandBiomolecules	2018	<ol style="list-style-type: none"> 1. Easily understand the difference between prokaryotic and eukaryotic cells, and the concept of cell division. 2. Understand the classification, structure and biochemical reactions of aminoacidsand proteins. 3. Describe the classification, structure and biochemical reactions of carbohydrates and lipids. 4. Understand the concept of structural organization of nucleic acids

7	BCH 201	Energy metabolism	2018	<ol style="list-style-type: none"> 1. Explain the broad outlines of intermediary metabolism and importance of carbohydrate metabolism in life. 2. Describe the importance of Electron transport and ATP production mechanism. 3. Gain in knowledge in Carbohydrate metabolism and their associated disorders. 4. Describe the details of lipid metabolism.
8	BCH 202	Metabolism of Nitrogen based molecules	2018	<ol style="list-style-type: none"> 1. Understand the anabolic and catabolic reactions of proteins and amino acids. 2. Gain knowledge in the importance of amino acids as biosynthetic precursors. 3. Know the biosynthesis and degradation of purine and pyrimidine and their associated disorders. 4. How toxic chemicals are metabolised by the body through detoxification and the mechanism of carcinogenicity.
9	BCH 203P	Practical related to Enzymology	2018	<ol style="list-style-type: none"> 1. Learn about estimation of various enzymes in biological sample. 2. Learn to perform assay of clinically important enzyme: serum acid and alkaline phosphatase, serum LDH. 3. Learn about the factors affecting enzyme activity and determination of K_m. 4. Demonstrate the Immobilization of enzymes.
10	BCH 204P	Practical related to Molecular Biology	2018	<ol style="list-style-type: none"> 1. Isolate nucleic acids from various sources. 2. Estimate the nucleic acids quantitatively. 3. Determine the melting temperature. 4. Determine the purity of DNA by UV method.

11	BCH 205	Human values and Professional ethics-II	2018	<ol style="list-style-type: none"> 1. Easily understand the Components, Structure and responsibilities of family and status of women in family and society. 2. To get an idea on Ethical issues in relation to health care professionals and patients and genetic engineering, Social justice in health care, Human cloning. 3. To know about Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics. 4. Understand the Ethical theory, Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population. 5. Gain the knowledge about Organ trade, Human trafficking, Human rights violation and social disparities, Feminist ethics, Surrogacy/ pregnancy.
12	BCH 206	Enzymology	2018	<ol style="list-style-type: none"> 1. Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms. 2. Describe the concepts of enzyme inhibition and mechanism of enzyme catalysis. 3. Students will acquaint with mechanism of enzyme action and various coenzymes involved in the biochemical reactions taking place in living systems. 4. Describe the concepts of co-operative behavior and allosteric regulation.
13	BCH 301	Microbial Biochemistry	2018	<ol style="list-style-type: none"> 1. Understand the basics of microbiology like

		andGenetics		<p>nomenclature andclassification of microorganisms, understand the various biological and non-biological method to control microorganisms</p> <ol style="list-style-type: none"> 2. The student will learn about different mode of nutrition in microorganisms and about viruses - Isolation, purification and characterization. 3. Understand the basics of genetics and the gene arrangement in prokaryotes and eukaryotes. 4. Gain knowledge in bacterial genetics includes the different types plasmids, recombination in bacteria, bacteriophages and bacterial defense mechanism(CRISPR) and Describe the various types of mutations and its effect.
14	BCH 302	MolecularBiology	2018	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learnabout the mechanism and regulation of transcription in prokaryotes and eukaryotes. 3. Learnabout genetic code and their evolution. 4. Gain knowledge in Different stages and components of protein synthesis.
15	BCH 303P	PracticalrelatedtoMicrobiology	2018	<ol style="list-style-type: none"> 1. Handle the microscope. 2. Learn Methods of sterilization and preparation of various culture media, Purification techniques. 3. Identification of isolated bacteria, and Growth curve of microorganism. 4. Learn Staining techniques for bacteria and yeast. 5. Gain knowledge in the Preparation of wine from Grapes. 6. Production and estimation of alcohols, citric acid, lactic acid etc.

16	BCH 304P	Practical related to Clinical Biochemical Analysis	2018	<ol style="list-style-type: none"> 1. Collect and maintain the biological samples for clinical assay. 2. Estimate the blood and serum enzymes for diagnosis of diseases. 3. Qualitatively analyse the abnormal constituents in urine. 4. Work with diagnostic kits
17	BCH305 Generic Elective (Two papers out of three)	<ol style="list-style-type: none"> a) Molecular Endocrinology b) Clinical Biochemistry Cell and Developmental Biology 	2018	<ol style="list-style-type: none"> 1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands. 2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands. 3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones. 4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones.
18	BCH 305 B	Clinical Biochemistry	2018	<ol style="list-style-type: none"> 1. Maintain clinical biochemistry laboratory, biological specimen collection for clinical assay and investigation of disorders associated with carbohydrates. 2. Learn and understand the Inborn errors of amino acid metabolism, Lipid metabolism and Renal function system. 3. Gain knowledge in clinical enzymology and Disorders of Gastrointestinal Tract. 4. Investigate the serum enzymes in liver
19	BCH-305c	Cell and Developmental Biology	2018	<ol style="list-style-type: none"> 1. Acquire knowledge on basic concepts of Developmental Biology. 2. Gain the proficient knowledge about zygote formation, blastula formation, gastrulation and

				<p>many events in early development.</p> <ol style="list-style-type: none"> Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants. Acquire knowledge about biomembrane concept and various membrane transport systems
20	<p>BCH306 Open Elective courses</p>	<p>a) General Biochemistry</p> <p>b) Environmental Biochemistry</p>	2018	<ol style="list-style-type: none"> Understand the classification, structure and biochemical reactions of amino acids and proteins. Describe the classification, structure and biochemical reactions of carbohydrates and lipids. Understand the concept of structural organization of nucleic acids. <ol style="list-style-type: none"> Describe the Structure of porphyrins, Chemistry and functions of water and fat soluble vitamins. Students will be able to know how to conserve natural resources for future. Students will be able to describe differing types of <i>ecosystems</i> and their characteristic features. Gain the knowledge about different types of pollution in the environment. Know the Relation between human population and environment. <ol style="list-style-type: none"> Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research. Learn about basic Radioactivity principles,

		c) Experimental aspects related to analytical methods		<p>measurement method and its biological applications.</p> <p>3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields.</p> <p>4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques</p>
21	BCH401	Genetic Engineering	2018	<p>1. Familiar with the tools and techniques for isolation and purification of genes, vector construction.</p> <p>2. Understand the mechanisms of regulation of gene expression in different operons.</p> <p>3. Know the techniques for transfer and expression of cloned gene and</p> <p>4. Apply the knowledge of genetic engineering in biological research.</p> <p>5. principle, Bioinstrumentation and applications of spectroscopy techniques.</p>
22	BCH402	Technical Writing, Biostatistics and Bioinformatics	2018	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Learn to apply hypothesis testing via some of the statistical distributions.</p> <p>3. Develop understanding about biological data and database search tools.</p> <p>4. Acquire hands on training on various computational tools and techniques employed in biological sequence analysis</p>

		c)PlantBiochemistry		3Understand the Concepts of natural evolution and population genetics.
26	BCH406 OpenElective toothers(Forothers departmentstudents)	a) ResearchMethodology b) Biochemistryofdiseases	2018	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about Biological data and database search tools. 4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis <p>1Maintain clinical biochemistry laboratory, biological specimen collection for clinical assay and investigation of disorders associated with carbohydrates.</p> <p>2Learn and understand the Inborn errors of amino acid metabolism, Lipid metabolism and Renal function system.</p> <p>3Gain knowledge in clinical enzymology and Disorders of Gastrointestinal Tract.</p> <p>4.Investigate the serum enzymes in liver diseases</p>
27		C)NutritionalBiochemistry	2018	<ol style="list-style-type: none"> 1. Determine the body composition and body weight by using various methods. 2. To describe the importance of protein and fats. 3. Gain knowledge on vitamins and minerals to maintain health. 4. Aquire knowledge on nutritional importance in different ages in the life

Immunotechnology

S.No.	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	Core1	Biochemical and Biophysical methods	2018	<ol style="list-style-type: none"> 1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research. 2. Learn about basic Radioactivity principles, measurement method and its biological applications. 3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields. 4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques
2	Core2	Molecular Physiology and community nutrition	2018	<ol style="list-style-type: none"> 5. Gain the knowledge about circulatory and excretory systems. 6. Know the importance of muscular and nervous system. 7. Health benefits and malnutrition of proteins and fats. 8. Know the importance of nutrition in maintenance of health and diseases
3	Core3P	Practical related to Preparations and Analysis Biochemical	2018	<ol style="list-style-type: none"> 1. Learn safety and precautionary measures for working in a laboratory. 2. Develop skill and proficiency in preparation of laboratory reagents and Use of handling of glass wares, minor equipment for conducting experiments 3. Acquire practical training for qualitative and quantitative analysis of biological materials/molecules and their estimation using multiple methods. 4. Gain the knowledge about isolation studies of biological samples.
4	Core4P	Practical related to Analytical methods	2018	<ol style="list-style-type: none"> 1. Learn how to standardize various biomolecules. 2. Separate biomolecules by paper chromatography and thin layer

				<p>chromatography</p> <p>3. Demonstrate separation of protein by electrophoresis.</p> <p>4. 4. Isolation and spectrophotometric characterization of plant pigments</p>
5	Compulsory Foundation	Cell and Biomolecules	2018	<p>6. Easily understand the difference between prokaryotic and eukaryotic cells, and the concept of cell division.</p> <p>7. Understand the classification, structure and biochemical reactions of amino acids and proteins.</p> <p>8. Describe the classification, structure and biochemical reactions of carbohydrates and lipids.</p> <p>9. Understand the concept of structural organization of nucleic acids.</p>
6	Elective foundation	Human values and Professional ethics-I	2018	<p>10. Easily understand the Need and Importance of Professional Ethics- Goals- Ethical Values in various Professions.</p> <p>11. Analyse the basic moral concepts- right , ought, duty, obligation, justice, responsibility and freedom.</p> <p>12. Know about Purusharthas, Dharma, Artha, Kama, Moksha.</p> <p>13. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavratas and anuvratas.</p> <p>14. Gain the knowledge about views on Manu and Yajnavalkya.</p>
7	Core1	Energy metabolism	2018	<p>Explain the broad outlines of intermediary metabolism and importance of carbohydrate metabolism in life.</p> <p>2. Describe the importance of Electron transport and ATP production mechanism.</p> <p>3. Gain in knowledge in Carbohydrate metabolism and their associated disorders.</p> <p>4. Describe the details of lipid metabolism.</p>
8	Core2	Metabolism of	2018	<p>1. Understand the anabolic and catabolic reactions of proteins</p>

		Nitrogenbased molecules		<p>and aminoacids.</p> <ol style="list-style-type: none"> Gain knowledge in the importance of aminoacids as biosynthetic precursors. Know the biosynthesis and degradation of purine and pyrimidined and their associated disorders. How toxic chemicals metabolised by the body through detoxification and the mechanism of carcinogenicity.
9	Core3	Practicalrelatedto Enzymology	2018	<ol style="list-style-type: none"> Learnabout estimation of various enzymes in biological sample. Learn to perform assay of clinically important enzyme: serum acid and alkaline phosphatase, serum LDH. Learn about the factors affecting enzyme activity and determination of Km. Demonstrate the Immobilization of enzymes
10	Core4	Practicalrelatedto MolecularBiology	2018	<ol style="list-style-type: none"> Isolate DNA from bacterial, plant and animal cells and RNA from yeast cells. Estimate concentrations of DNA and RNA by conventional methods and UV absorption methods. Determine the melting temperature(T_m) of DNA. Learn procedures for isolation of phageM₁₃ and single and double standard M₁₃DNA.
11	Compulsory Foundation	Enzymology	2018	<ol style="list-style-type: none"> Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms. Describe the concepts of enzyme inhibition and mechanism of enzyme catalysis. Students will acquaint with mechanism of enzyme action and various coenzymes involved in the biochemical reactions taking place in living systems. Describe the concepts of co-operative behaviour and allosteric regulation
12	Elective foundation	Humanvaluesand Professionalethics-II	2018	<ol style="list-style-type: none"> Easily understand the Components, Structure and responsibilities of family and status of women in family and

				<p>society.</p> <ol style="list-style-type: none"> 7. To get an idea on Ethical issues in relation to health care professionals and patients and genetic engineering, Social justice in health care, Human cloning. 8. To know about Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics. 9. Understand the Ethical theory, Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population. 10. Gain the knowledge about Organtrade, Humantrafficking, Humanrights violation and social disparities, Feminist ethics, Surrogacy/ pregnancy
13	Core1	Microbial Biochemistry and Genetics	2018	<ol style="list-style-type: none"> 1. Understand the basics of microbiology like nomenclature and classification of microorganisms and different modes of nutrition in microorganisms. 2. Learn and understand the various biological and non-biological methods to control microorganisms and Biology of subviral agents – Viroids, Prions, Satellite viruses. 3. Understand the basics of genetics and the gene arrangement in prokaryotes and eukaryotes. 4. Gain knowledge in bacterial genetics like different types plasmids, recombination in bacteria, bacteriophages and bacterial defense mechanism (CRISPR) and various types of mutations and their effects
14	Core2	Immunology	2018	<ol style="list-style-type: none"> 1. Gain knowledge on different types of antigens, antibodies and how different types of antibodies are produced. 2. Outline, compare and contrast the key mechanism of innate and adaptive immunity 3. Gain knowledge on undesirable immunological reactions and their complications in health management 4. Apply knowledge in disease diagnosis through serological tests
15	Core3	Practical related to Microbiology	2018	<ol style="list-style-type: none"> 1. Handle the microscope. 2. Learn Methods of sterilization and preparation of various

				<p>culture media, Purification techniques.</p> <ol style="list-style-type: none"> 3. Identification of isolated bacteria, and Growth curve of microorganism. 4. Learn staining techniques for bacteria and yeast. 5. Gain knowledge in the Preparation of wine from Grapes. 6. Production and estimation of alcohols, citric acid, lactic acid etc
16	Core4	Practicalrelatedto Immunology	2018	<ol style="list-style-type: none"> 1. Perform RBC, WBC count and differential count. 2. Do all haematological tests that will be done in clinical labs. 3. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc. 4. Do Heme agglutination tests for identification of different antigens
17	Generic Elective(Two papersoutof three)	a)MolecularBiology	2018	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learnabout the mechanism and regulation of transcription in prokaryotes and eukaryotes. 3. Learnabout genetic code and their evolution. 4. Gain knowledge in Different stages and components of protein synthesis
		b)Molecular Endocrinology		<ol style="list-style-type: none"> 1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands. 2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands. 3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones. 4. Acquire knowledge on Hormonal regulation of menstrualcycle anddisordersassociatedwithGonadalhormones.
		c)Cell and DevelopmentalBiology		<ol style="list-style-type: none"> 1. Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion,

				<p>Apoptosis, Senescence, integrins.</p> <p>2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development.</p> <p>3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants.</p> <p>4. Gain knowledge about Miscelle, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis.</p>
18	Open Elective to others (For other department students)	a) Basics of Immunology	2018	<p>1. Gain knowledge on essential features of different types of antigens, antibodies.</p> <p>2. Outline, compare and contrast the key mechanism of innate and adaptive immunity.</p> <p>3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation.</p> <p>4. Apply knowledge in disease diagnosis through serological tests.</p>
		b) Immunotechniques		<p>1. To purify and analyse the antigens and antibodies.</p> <p>2. To apply different Hybridization techniques and ELISA, RIA.</p> <p>3. To detect various diseases by application of anti sera.</p> <p>4. To engineer antibodies and catalytic antibodies and produce drugs to allergies</p>
19	Core 1	Microbial Biochemistry and Genetics	2018	<p>1. Familiar with the tools and techniques for isolation and purification of genes, vector construction.</p> <p>2. Understand the mechanisms of regulation of gene expression in different operons.</p> <p>3. Know the techniques for transfer and expression of cloned</p>

				gene and 4. Apply the knowledge of genetic engineering in biological research
20	Core2	Immunology	2018	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical distributions. 3. Develop understanding about Biological data and database search tools. 4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis
21	Core3	Practical related to Microbiology	2018	<ol style="list-style-type: none"> 1. Use diagnostic kits to test different types of auto immune diseases. 2. Prepare Rabbit for performance of immunological studies. 3. Perform Single Radial Immunodiffusion. 4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc. 5. Do Heme agglutination tests for identification of different antigens
22	Core4	Practical related to Immunology	2018	<ol style="list-style-type: none"> 1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 2. Learn structure, function of gene and its transfer methods 3. Develop understanding on cause, spread and control of diseases caused by different microorganisms 4. Get knowledge on collection of data, thesis writing.
23	Generic Elective (Two papers out of three)	a) Molecular Biology	2018	<ol style="list-style-type: none"> 1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication. 2. Learn about the mechanism and regulation of transcription in prokaryotes and eukaryotes. 3. Learn about genetic code and their evolution. 4. Gain knowledge in Different stages and components of protein synthesis

		b)MolecularBiology	2018	<ol style="list-style-type: none"> 1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands. 2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands. 3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones. 4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones
		c) Cell and Developmental Biology	2018	<ol style="list-style-type: none"> 1. Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion, Apoptosis, Senescence, integrins. 2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development. 3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants. 4. Gain knowledge about Miscelle, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis
24	Open Elective to others (For other department students)	c) Basics of Immunology Immunotechniques	2018	<ol style="list-style-type: none"> 1. Gain knowledge on essential features of different types of antigens, antibodies. 2. Out line, compare and contrast the key mechanism of innate and adaptive immunity. 3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation. 4. Apply knowledge in disease diagnosis through serological tests.
25	Open Elective (b)	<i>Immunotechniques and their Applications</i>	2018	<ol style="list-style-type: none"> 1. To purify and analyse the antigens and antibodies. 2. To apply different Hybridization techniques and ELISA, RIA.

				<p>3. To detect various diseases by application of antiisera.</p> <p>4. To engineer antibodies and catalytic antibodies and produce drugs to allergies.</p>
26	Core1	<i>Genetic Engineering</i>	2018	<p>1.Familiar with the tools and techniques for isolation and purification of genes, vector construction.</p> <p>2.Understand the mechanisms of regulation of gene expression in different operons.</p> <p>3.Know the techniques for transfer and expression of cloned gene and</p> <p>4.Apply the knowledge of genetic engineering in biological research</p>
27	Core2	<i>Technical Writing, Biostatistics and Bioinformatics</i>	2018	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Learn to apply hypothesis testing via some of the statistical distributions.</p> <p>3. Develop understanding about Biological data and database search tools.</p> <p>4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis.</p>
28	Core3P	<i>Practical related to Clinical Immunology, Biostatistics and Bioinformatics</i>	2018	<p>1.Use diagnostic kits to test different types of auto immune diseases.</p> <p>2. Prepare Rabbit for performance of immunological studies.</p> <p>3. Perform Single Radial Immunodiffusion.</p> <p>4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc.</p> <p>5. Do Heme agglutination tests for identification of different antigens</p>
29	Core4	<i>Project Work</i>	2018	<p>1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures</p> <p>2. Learn structure, function of gene and its transfer methods</p>

				<ul style="list-style-type: none"> 3. Develop understanding on cause, spread and control of diseases caused by different microorganisms 4. Get knowledge on collection of data, thesis writing
30	Generic Elective (a)	<i>Clinical Immunology</i>	2018	<ul style="list-style-type: none"> 1. Understand different types of immunity and components of the Immune System. 2. Gain knowledge on auto immune diseases, Animal models used to study them and the treatment for them. 3. Familiar with Clinical manifestation of graft rejection, general immunosuppressive therapy and immune tolerance to allografts. 4. Acquire the knowledge on oncogenes, Psychoimmunology and neuroimmunomodulation
31	Generic Elective (b)	<i>Applied And Molecular Immunology</i>	2018	<ul style="list-style-type: none"> 1. Develop skill in production of monoclonal antibodies. 2. How better enzyme immobilization enhances its activity and their industrial and clinical applications. 3. Familiar with different types of vaccines and how they help in prevention of diseases. 4. Acquire the knowledge on IPR and procedures for patent filing
32	General Elective (C)	<i>Immunopharmacology</i>	2018	<ul style="list-style-type: none"> 1. Understand about drug receptors, pharmacodynamics, pharmacokinetics, drug biotransformation. 2. Acquire knowledge on Immunomodulation therapy, malignancy therapy. 3. Gain knowledge on Prostaglandins, thromboxanes, leukotrienes and inhibitors of these molecules formation. 4. Familiar with Nitric oxide and its immunological effects.
33	Open Elective a	<i>Research Methodology</i>	2018	<ul style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Acquire hands on training on various computational tools and techniques. 3. Learn to apply hypothesis testing via some of the statistical distributions. 4. To acquire knowledge on research proposals and motivate students towards research

34	Open Elective (b)	<i>Immunological Diseases and Therapeutics</i>	2018	<ol style="list-style-type: none"> 1. Maintain the Clinical Immunology lab with all required standards. 2. Outline, compare and contrast the key mechanism of innate and adaptive immunity. 3. Gain knowledge on different types of immunodeficiencies, their treatment and about autoimmune disorders. 4. Familiar with Clinical manifestation in graft acceptance or rejection and how immunosuppressive therapy is useful. And about cancer immunotherapy.
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30. Botany

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	BOT-101	Algae, Bryophytes, Pteridophytes and Gymnosperms	2018	<ol style="list-style-type: none"> 1. The student able to distinguish different species of lower plant groups. 2. Cultivation methods of Algae for industrial production of Single Cell Proteins, Agar Agar, carragin and Nutraceuticals. Discuss the importance of morphological structure, classification, reproduction and economic importance of Algae.
	BOT-102	Taxonomy of Angiosperms	2018	<ol style="list-style-type: none"> 1) Plant identification skills 2) Herbaria preparation and documentation.
	BOT-103	Microbiology	2018	<ol style="list-style-type: none"> 1. Isolation and identification of Pathogenic and Non-Pathogenic micro-organisms. 2. Methods of cultivation of economically/industrially important microorganisms. 3. Plant disease identification and control methods.
	BOT-104	Human Values and Professional Ethics - I	2018	<ol style="list-style-type: none"> 1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.

				<ol style="list-style-type: none"> 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
	BOT-105P	Practical-I Algae, Bryophytes, Pteridophytes and Gymnosperms & Taxonomy of Angiosperms	2018	<ol style="list-style-type: none"> 1) Identification of different Algal forms 2) Morphological description and use of Floral Keys for plant identification.
	BOT-106P	Practical-II Microbiology & Plant Development and Reproduction	2018	<ol style="list-style-type: none"> 2. Isolation, culture and staining methods for identification of micro-organisms. 3. Diagnosis of Plant deceases based on symptoms and control methods. 3. Histology of vegetative and reproductive structures and isolation
	BOT-201	Plant Ecology	2018	<ol style="list-style-type: none"> 1) Concepts of Ecology Students, relation between biotic and abiotic factors in an ecosystem. 2) Interaction between biotic communities and ecological energetics 3) Environmental pollution, Global warming and Environmental protection strategies and green energy production
	BOT-202	Plant Biochemistry and Metabolism	2018	<ol style="list-style-type: none"> 1) Biosynthesis of plant primary metabolites and chemistry. 2) Plant physiological processes water relation, plant nutrition and energy metabolism, 3) Metabolic changes in response to biotic and abiotic stress
	BOT-203	Plant Development and Reproduction	2018	<ol style="list-style-type: none"> 1. Wood formation and types 2. Reproductive structures. Mode of Reproduction
	BOT-204	Human Values and Professional Ethics - II	2018	<ol style="list-style-type: none"> 1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day

				<p>today life.</p> <ol style="list-style-type: none"> 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
	BOT-205P	Practical-I Plant Biochemistry and Metabolism & Phytobiodiversity and Conservation	2018	<ol style="list-style-type: none"> 1. Plant metabolite analysis and metabolic enzyme activity 2. Methods for Phytodiversity analysis.
	BOT-206P	Practical-II Plant Ecology & Cell Biology, Genetics and Evolution	2018	<ol style="list-style-type: none"> 1) Plant communities 2) Methods for analysis of environmental pollutants 3) Designs of waste water treatment plants. 4) Assessment of effect of Global warming on Plant systems 5) Study of chromosomal morphology and behavior in Mitosis and Meiosis 6) Practical Problem solving on genetic concepts
	BOT-301	Molecular Biology And Techniques	2018	<ol style="list-style-type: none"> 1. Nucleic acids properties and mechanism of DNA replication and damage repair, and Chromatin organization and Cell Cycle regulation 2. Gene expression, processing of Transcripts and Proteins, and mechanisms of regulation of gene expression in Prokaryotes and Eukaryotes. 3. Principles of Microscopy, Nucleic acid and protein separation and identification techniques and methods
	BOT-302	Biodiversity and Conservation	2018	<ol style="list-style-type: none"> 1. Knowledge on Phytodiversity, biodiversity centres and types of Biodiversity. 2. Phytodiversity analysis using Remote sensing 3. Causes for the loss of phytodiversity and conservation strategies

	BOT-303 IE	Biosystematics	2018	<ol style="list-style-type: none"> 1. Biosystematic Categories, 2. Omega Taxonomy 3. Taximetrics and Concept of Species
	BOT-304IE	Molecular Plant Pathology	2018	<ol style="list-style-type: none"> 1. Symptoms based Diagnosis of Plant Diseases 2. Methods of Plant Disease Management and pest control
	BOT-307 IE	Plants and Human Welfare	2018	<ol style="list-style-type: none"> 1. Food Yielding Plants as a source of food, fiber and timber. 2. Plants used in curing human diseases and other ailments in traditional medical systems and Veterinary diseases 3. Spices and condiments, Non timber forest products. 4. Preparation and application of Bio fertilizers, Bio pesticides, Bio insecticides, mushroom cultivation and plant based preservatives
	BOT-308 IE	Organic Farming and Mushroom Cultivation	2018	<ol style="list-style-type: none"> 1. Different types of compost preparation and their Nutritive value. 2. Biofertilizers and organic preparations, their marketing and farm management. 3. Vermicompost Technology 4. Identification of types of edible and poisonous mushrooms. 5. Method of cultivation of mushrooms and diseases management
	BOT-309 IE	Gardening and Nursery Techniques	2018	<ol style="list-style-type: none"> 1. Nurseries development and Management and Garden designing for different plant groups 2. <i>In vivo</i> and <i>in vitro</i> plant propagation methods 3. Plant nutrition and protection 4. Types of gardens and nurseries
	Practical-I	Molecular Biology And Techniques ; Biodiversity and Conservation	2018	<ol style="list-style-type: none"> 1.. Study of Chromosomal Behavior during Mitosis. 2. Isolation of DNA, RNA and proteins, Quantitative estimation 3. Assignments on DNA structure, Replication and Gene expression 4. Methods for Phytodiversity analysis. 5. Plant diversity conservation methods

Practical-II	Biosystematics / Molecular Plant Pathology	2018	<p>Biosystematics</p> <ol style="list-style-type: none"> 1. Isolation of Pathogenic Fungi and Bacteria. 2. Estimation of Rhizosphere, Phyllosphere, Spermosphere microorganisms by Serial dilution methods. 3. Screening of Botanical Pesticides (plant extracts) against Fungal Pathogens 4. Preparation of Plant Pathology Herbarium <p>Molecular Plant Pathology</p> <ol style="list-style-type: none"> 1. Isolation of Pathogenic Fungi and Bacteria. 2. Estimation of Rhizosphere, Phyllosphere, Spermosphere microorganisms by Serial dilution methods. 3. Screening of Botanical Pesticides (plant extracts) against Fungal Pathogens 4. Preparation of Plant Pathology Herbarium
BOT-401	Molecular Genetics & Genomics and Proteomics	2018	<ol style="list-style-type: none"> 1. Genetic basis of inheritance of genes and their mapping in eukaryotes and microbes 2. Molecular marker techniques and construction of genetic and physical maps. 3. Whole genome sequencing strategies, and structural and functional annotation. 4. Principles and methods of Transcriptome and Proteome analysis. 5. Mechanisms of evolution of genomes, New genes and proteins and construction of Phylogenetic trees. 6. Structural organization of plant genomes, Arabidopsis and rice genomes and applications of genome projects.
BOT-402	Plant Biotechnology	2018	<ol style="list-style-type: none"> 1. Techniques of Plant Tissue Culture and Applications. 2. Process of r-DNA technology 3. Production of genetically modified crops and Achievements

	BOT-403 IE	Molecular Plant Physiology	2018	<ol style="list-style-type: none"> 1. 1.Signal transduction pathways and Senescence 2. 2.Molecular mechanism of Photosynthesis 3. Synthesis and application of Nanomaterials. 4. Molecular Physiology of Stress and Flowering
	BOT-404 IE	Horticulture and Agricultural Biology	2018	<ol style="list-style-type: none"> 1. Propagation methods for horticultural crops 2. Soil science and fertility management for horticultural crops. 3. Seed production technology of horticultural crops.
	BOT-405 IE	Ethnobotany and Phytomedicine	2018	<ol style="list-style-type: none"> 1.Ethnobotanical knowledge 2. Medicinal plant Cultivation, Multiplication, Collection, Processing and Marketing 3. Sources of Plant Medicines, Formulations, Diagnostic features and their Biological activity.
	Practical – I	Molecular Genetics & Genomics and Proteomics; Plant Biotechnology	2018	<ol style="list-style-type: none"> 1) Isolation of genomic DNA and RNA and Quantification by Spectrophotometry. 2) Preparation of DNA denaturation curve 3) Restriction digestion of DNA, Agarose Gel Electrophoresis 4) PCR amplification of DNA. and RAPD analysis. 5) Precipitation of proteins ,Estimation of protein. 6) Determination of Isoelectric Point of proteins 7) Separation of proteins by SDS-PAGE and size determination 8) Problems related to genomics, proteomics and molecular evolution 9) Establishment of callus, organ and cell cultures
	Practical - II	Molecular Plant Physiology / Horticulture and Agricultural Biology / Ethnobotany and Phytomedicine	2018	<p>BOT-403 IE : Molecular Plant Physiology</p> <ol style="list-style-type: none"> 1. Extraction and Estimation of Chlorophyll pigments. 2. Assay of enzyme activity 3. Estimation of Carbohydrate, proteins and separation 4. Seed viability and germination 5. Metabolite accumulation under stress <p>BOT-404 IE: Horticulture and Agriculture Biology</p>

				<ol style="list-style-type: none"> 1. Isolation, Characterization and Identification of Rhizobium 2. Outdoor cultivation of Blue green Algae 3. Vermicompost production 4. Multiplication of VAM and Preparation Biofertilizers; 5. Establishment of nursery, different containers, soil transplantation techniques. 6. Plant propagation – layering, cutting, grafting. 7.. Layout and Designing of gardens and Lawns. <p>BOT-405 IE: Ethnobotany and Phytomedicine</p> <ol style="list-style-type: none"> 1. Recording medicinal practices and herbal formulations of tribal medicine by interviews and field study and preparation of report. 2. Development of medicinal plant nurseries in botanical garden. 3. Practical Methods of Cultivation, Propagation, Conservation and Protection of important Medicinal plants to develop familiarity. 4. Micro-propagation of Medicinal plants and Production of Callus from different Explants for Specific Biologically active Ingredients. 5. Practical demonstration of collection, processing and storage of Plant Medicines. 6. Demonstration of drug Formulation and Herbal cosmetics. 7. Organoleptic examination and physical and chemical properties.
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31. Biotechnology

	PROGRAMME	COURSE CODE	COURSE TITLE	Years of Introduction	Course Outcomes
1	M.Sc. Biotechnology	BTH 101	Structure and Functions of Biomolecules	2018	<ol style="list-style-type: none"> 1. Understand the classification of carbohydrates and their biochemical functions. 2. Correlate the reactions of amino acids that are basis for identification tests and biochemical pathways. 3. Know the structure of different classes of lipids and their roles in biological systems. 4. Comprehend the structure and functions of nucleic acids
		BTH102	Advanced Tools and Techniques	2018	<ol style="list-style-type: none"> 1. Learn about various techniques for isolation and concentration of macromolecules. They will also understand the principles and applications of different Microscopes 2. Understand the techniques of chromatography, centrifugation and electrophoresis 3. Achieve a basic understanding of characterization of biomolecules by different Spectroscopic techniques 4. They learn safety measures in handling radioisotopes and familiarize with the various radioisotope tracer techniques and their role in biology.
		BTH103P	Practicals related to Biochemical Preparations and Analysis & Analytical Methods	2018	<ol style="list-style-type: none"> 1. Acquire the skill to perform experiments related to Biochemical preparations and advanced tools and techniques
		BTH104P	Practicals related to	2018	<ol style="list-style-type: none"> 1. Obtain the skill to perform experiments

			Microbiology and Immunology		related to Microbiology and Cell Biology
		BTH105	Microbiology and Immunology	2018	<ol style="list-style-type: none"> 5. Acquire the knowledge on classification and structure of different microorganisms 6. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 3. Out line, compare and contrast the key mechanism of innate and adaptive immunity 4. Apply knowledge in disease diagnosis through serological tests
		BTH106	Human values and Professional ethics-I	2018	<ol style="list-style-type: none"> 1. Learn the importance of Human values and Professional ethics
		BTH 201	Enzymes and Intermediary Metabolism	2018	<ol style="list-style-type: none"> 1. Gain knowledge on different enzymes and their significance 2. Correlate how the living organisms exchange energy and matter with the surroundings for their survival, and store free energy in the form of energy-rich compounds 3. Recognize how the catabolic breakdown of the substances is associated with release of free energy; whereas, free energy is utilized during synthesis of biomolecules i.e., anabolic pathways 4. Apply the knowledge of metabolic pathways to biotechnological and biochemical research.
		BTH 202	Molecular Biology	2018	<ol style="list-style-type: none"> 1. Understand the biochemical composition and genome organization in living cells 2. Learn about the mechanism of tissue specific transcription and role of RNA polymerases 3. Appreciate the correlation of genetic code with protein synthesis in prokaryotic and eukaryotic

					cells. 4. Gain insights of mechanism of gene expression and regulations
		BTH-203P	Practicals related to Enzymology & Molecular Biology	2018	Learn the skill to perform experiments related to Enzymology and Molecular Biology
		BTH-204P	Practicals related to Biostatistics and Bioinformatics	2018	Learn the skill to perform experiments related to Immunology and analyze data using various biostatistical methods.
		BTH 205	Research Methodology, Biostatistics and Bioinformatics	2018	<ol style="list-style-type: none"> 4. Discuss the various steps involved in conducting research 5. Learn to apply hypothesis testing via some of the statistical distributions 5. Develop understanding about Biological data and database search tools 7. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis
		BTH 206	Human values and Professional ethics-II	2018	Learn the importance of Human values and Professional ethics
		BTH 301	Genetic Engineering	2018	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes 2. Acquire knowledge on vectors for construction of genomic libraries and cDNA libraries 3. Understand the mechanism of cDNA synthesis 4. Know the techniques for transfer and expression of cloned gene and applications of genetic engineering in biological research.
		BTH-302	Cell and Tissue culture	2018	Gain the knowledge regarding plant and animal cell cultures. Get the skill to perform

					micropropagation.
		BTH 303P	Practicals related to Genetic Engineering, Cell and Tissue culture & Food and Industrial Biotechnology	2018	Learn the skill to perform the techniques for transfer and expression of cloned gene and applications of genetic engineering in biological research
		BTH 304 a.	Bioprocess Engineering and Technology	2018	<ol style="list-style-type: none"> 1. Handle the axenic cultures of industrially important microbes and appreciate the relevance of microorganisms from industrial context. 2. Gain an overview on design, operations and types of fermentation systems 3. Calculate yield and production rates in a biological production process, and also interpret data 4. Apply knowledge on separation and purification of end products of fermentation
		BTH 304b.	Legal, Ethical and Implications of Biotechnology	2018	<ol style="list-style-type: none"> 1. Develop awareness on types IPR and patenting process 2. Understand legal and ethical controversies in biotechnological innovations 3. Apply knowledge in providing safety of food, water and environment 4. Gain overview of GM crops and microbes and their impact on environment
		BTH 304c.	Food and Industrial Biotechnology	2018	<ol style="list-style-type: none"> 1. Acquire knowledge on food preservation, processing and control measures for food poisoning 2. Establish indoor and outdoor cultivation units for algal cultivation 3. Learn effective management of solid waste for

					energy production. 4. Appreciate the industrial role of microorganisms in production of biomolecules
		BTH 305 a	Plant Tissue Culture	2018	<ol style="list-style-type: none"> 1. Learn important milestones in the plant tissue culture and understand the concepts and principles of Plant tissue culture. 2. Learn different pathways of plant regeneration under in vitro conditions – organogenesis, somatic embryogenesis, synthetic seeds and applications. 3. Understand techniques of establishing cell suspension culture, techniques of virus elimination by meristem and shoot tip culture. 4. Acquire skill of propagation of elite medicinal and economically important plants and establish micropropagation unit for commercialization.
		BTH 305 b	Bioethics	2018	<ol style="list-style-type: none"> 1. Acquire the knowledge on IPR and procedures for patent filing 2. Understand the Legal and Ethical aspects of gene therapy - cloning - Manipulation of human genome -Technology transfer. 3. Learn role of Government, Industries and society in promoting, accepting and regulating the rDNA research 4. Develop understanding on Environmental and Health aspects of Biotechnology
		BTH 305 c	Bioinformatics	2018	<ol style="list-style-type: none"> 1. Develop understanding about Biological data and database search tools 2. Acquire hands on training on various computational tools and techniques employed

					<p>in Biological sequence analysis</p> <ol style="list-style-type: none"> 3. Learn about pathway and enzyme databases, Sequence submission tools 4. Develop understanding on protein folding and its significance
		BTH 401	Environmental Biotechnology	2018	<ol style="list-style-type: none"> 1. Learn the relation between biotic and abiotic factors in different ecosystem models and predict how changes in free energy availability affect ecosystems. 2. Appreciate the role of microorganisms in biodegradation and pollution detection 3. Develop skill on large scale production and applications of bio pesticides and bio fertilizers fin agriculture 4. Apply knowledge on solid waste management and reclamation of waste water
		BTH 402	Plant Biotechnology	2018	<ol style="list-style-type: none"> 1. Develop skill in production of transgenic plants resistant to biotic and abiotic stress 2. Apply knowledge for industrial production of plant metabolites 3. Cultivate the micro and macro algae of commercial importance on large scale 4. Identify different plant pathogens and apply biological control methods
		BTH 403	Project work	2018	<ol style="list-style-type: none"> 1. Select the appropriate research design and develop appropriate research hypothesis for a research project and acquire hands on training on various tools and techniques employed in executing the project.
		BTH 404 a	Pharmaceutical Biotechnology	2018	<ol style="list-style-type: none"> 1. Gain knowledge on preparation and formulations of different drugs

					<ol style="list-style-type: none"> 2. Develop skill on commercial production of pharmaceutical products for human welfare 3. Learn the techniques of drug validation and vaccine production 4. Understand the bioethical principle, values, concepts and social and judicial implications of pharmaceutical biotechnology
		BTH 404b	Animal Biotechnology	2018	<ol style="list-style-type: none"> Understand the organization of reproductive organs and advances in contraception research 2. Learn the techniques of In Vitro Fertilization and artificial insemination 3. Develop skill in molecular techniques for production of transgenic animals 4. Apply knowledge on molecular farming for production of vaccines and hormones
		BTH 404c	Applications of Biotechnology	2018	<ol style="list-style-type: none"> 1.Acquire the knowledge on applications of plant, animal and environmental biotechnology 2.Develop skill on organic farming and preparation of bio pesticides and bio fertilizers 3.Establish and maintain cell lines for vaccine production 4.Apply knowledge on waste management and recycling for environmental protection
		BTH 404d	Practicals Related to Environmental Biotechnology & Plant	2018	<ol style="list-style-type: none"> 1.Learn the techniques related to Environmental and Plant biotechnology
		BTH 405a	Tools in Biotechnology	2018	<ol style="list-style-type: none"> 1. Acquire the knowledge on analysis of DNA replication to map site specific points of replication 2. Learn to apply DNA microarrays to detect

					<p>replication origins</p> <p>3. Understand the functions of helicase and polymerase in DNA replication</p> <p>4. Acquire knowledge on sophisticated programmed of genome replication</p>
		BTH 405b	Immunology	2018	<p>1. Out line, compare and contrast the key mechanism of innate and adaptive immunity</p> <p>2. Apply knowledge in disease diagnosis through serological tests</p> <p>3. Develop skill in production of monoclonal antibodies</p> <p>4. Gain knowledge on undesirable immunological reactions and their complications in health management</p>
		BTH 405c	Applications of Biotechnology	2018	<p>1. Acquire the knowledge on applications of plant, animal and environmental biotechnology</p> <p>2. Develop skill on organic farming and preparation of bio pesticides and bio fertilizers</p> <p>3. Able to establish and maintain cell lines for vaccine production</p> <p>4. Apply knowledge on waste management and recycling for environmental protection</p>

32. Chemistry

Analytical Chemistry

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1.	CHE-101	Inorganic Chemistry I	2018	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes. 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules. 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions 4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.
2.	CHE-102	Organic Chemistry I	2018	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereo controlled reactions 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents. 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates

				4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
3.	CHE-103	Physical Chemistry-I	2018	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics 2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories. 3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties. 4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification
4.	CHE-104	Inorganic Practical- I	2018	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations 2. To familiarize with techniques of titration and calculation of errors

5.	CHE-105	Organic Practical-I	2018	<ol style="list-style-type: none"> 1. .To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups 2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules.
6.	CHE-106	Physical Practical I	2018	<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data
7.	CHE-107	General Chemistry-I	2018	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation. 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS.
8.	CHE-108	Human Values and Professional Ethics – I	2018	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts character and Conduct. 3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya 4. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics

9.	CHE – 201	Inorganic Chemistry II	2018	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reaction
10.	CHE-202	Organic Chemistry II	2018	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E₁, E₂ and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments. 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions. 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions. 4. To understand the structural elucidation and

				synthesis of alkaloids using specific reagents.
11.	CHE -203	Physical chemistry II	2018	<ol style="list-style-type: none"> 1. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems 2. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants. 3. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem. 4. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system
12.	CHE 204	Inorganic Chemistry	2018	<ol style="list-style-type: none"> 1. To separate and determine the two component mixtures. 2. To acquire knowledge in the preparation of metal complexes
13.	CHE 106	Core practical II: Organic Chemistry	2018	<ol style="list-style-type: none"> 1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the 2. To get knowledge about the chemical behavior of different components and mechanisms

14.	CHE 206	Core practical II: Physical Chemistry	2018	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsager equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry.
15.	CHE 207	General Chemistry II	2018	<ol style="list-style-type: none"> 1. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes 2. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
16.	CHE208	Human Values and professional ethics-II	2018	<ol style="list-style-type: none"> 1. To understand the concepts of human values, responsibilities of family values and status of women in family and society 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 4. To familiarize environmental ethics, ethical theory and ecological crisis
17.	CHE-AC-301	Inorganic Spectroscopy and Thermal Methods of Analysis	2018	<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry.

				<ol style="list-style-type: none"> 2. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 3. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR. 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy
18.	CHE AC 303 & 304	Core-Practical: Classical Methods of Analysis	2018	<ol style="list-style-type: none"> 1. To know the basic principles of instrumental methods of analysis 2. To gain knowledge on chemistry of alloys 3. To Understand the complexity, theory and working principle of colourimetry 4. To familiarize with laws of colorimetric titrations
19.	CHE-AC-305A	Organic Chemistry III	2018	<ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents

				which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.
20.	CHE-AC-305B	Physical Chemistry III	2018	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_{2V} point group based on 3N Coordinates and to learn the Mutual exclusion Principle. 2. To learn the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy 4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
21.	CHE AC 306	Spectral Techniques	2018	<ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy. 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques. 3. To Understand the applications of AAS. 4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups

22.	CHE AC 306	Chromatographic Techniques	2018	<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques. 2. To familiarize applications of different chromatographic methods. 3. To Understand the principle of chromatographic techniques 4. To gain knowledge on the normal phase and reverse phase.
23.	CHE-AC-401	Quality Control and General Principles	2018	<ol style="list-style-type: none"> 1. To diagnose problems in the quality improvement process and Explain each total quality implementation phase 2. To know about theoretical basis for the use of organic reagents in inorganic analysis. 3. To understand different types of kinetic methods and their evaluation and to determine the kinetics of enzyme 4. To understand the oxidation reactions with Ce (IV) sulphate solutions and applications of complexometric titrations
24.	CHE-AC 402	: Instrumental Methods of Analysis	2018	<ol style="list-style-type: none"> 1. To understand the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF). 2. To understand the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC). 3. To get knowledge on instrumentation and

				<p>applications of GCMS in drug analysis and environmental samples analysis</p> <p>4. To improve the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I⁻ and S²⁻) by using I₂ liberations and Ce⁴⁺ liberation in solutions</p>
25.	CHE AC 403	Core practical I: Analytical Chemistry- Practical	2018	<ol style="list-style-type: none"> 1. Understand the common laboratory techniques including separation techniques 2. Polarography, atomic absorption spectroscopy in both emission and absorption mode. 3. Gain knowledge on implementation of gas chromatography and HPLC for separation of mixtures 4. Familiarize with interpretation of data to structures by NMR.
26.	CHE AC 404	Project Work	2018	<ol style="list-style-type: none"> 1. Perform experiments, collection and evaluation of data 2. Interpretation of results while adhering to scientific principles of responsible and ethical behaviour 3. Analysing and compiling the data and results in a chronological order in the form of dissertation. 4. Preparation of dissertation
27.	CHE-AC-405	Applied and Environmental Aspects	2018	<ol style="list-style-type: none"> 1. Have an idea about preparation of sampling, decomposition, separation and preconcentration of metal ions etc. 2. Gain experience on agrochemicals and fertilizers and their analysis

				<ol style="list-style-type: none"> 3. Have an idea on the analysis of fuels, alloys and explosives 4. Experience with environmental pollution monitoring techniques
28.	CHE-AC-406	Bioinorganic, Bioorganic, Biophysical Chemistry	2018	<ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes. 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters
29.	CHE AC 406A	Drug Chemistry	2018	<ol style="list-style-type: none"> 1. Know about natural products 2. Know Interpretation of cardiovascular drugs 3. Know the Analyzing about prostaglandins. 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.
30.	CHE AC 406 B	Electroanalytical Techniques	2018	<ol style="list-style-type: none"> 1. Know how to interpret potentiometry and conductometry 2. Know the Interpretation of results while adhering to DC Polarography 3. Know the Analysing and compiling the data and results in polarography . 4. Familiarize Types of ion sensitive electrodes

M.Sc., Environmental Chemistry

S.	Course Code	Title of the Course	Years	of	Course Outcomes
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No.			Introduction	
1.	CHE-101	Inorganic Chemistry- I	2018	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes. 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules. 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions 4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.
	CHE-102	Organic Chemistry I	2018	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
		Physical Chemistry- I	2018	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra,

	CHE-103			<p>Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics.</p> <ol style="list-style-type: none"> To learn about theories of reaction rates, Lindemann, Lindemann-Hinshelwood, and RRKM theories To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs-Duhem equation, calculation of thermodynamic properties To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckel Equation and its Verification
	CHE-104	Inorganic Practical- I	2018	<ol style="list-style-type: none"> To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations. To familiarize with techniques of titration and calculation of errors
	CHE-105	Organic Practical-I	2018	<ol style="list-style-type: none"> To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
	CHE-106	Physical Practical I	2018	<ol style="list-style-type: none"> To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different To calibrate the statistical data

CHE-107	General Chemistry-I	2018	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS
CHE-108	Human Values and Professional Ethics – I	2018	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts character and Conduct 3. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics
CHE-201	Inorganic Chemistry- II	2018	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions
CHE-202	Organic Chemistry -II	2018	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E_1, E_2 and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions

				<ol style="list-style-type: none"> To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions. To understand the structural elucidation and synthesis of alkaloids using specific reagents.
	CHE-203	Physical Chemistry- II	2018	<ol style="list-style-type: none"> To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system
	CHE-204	Inorganic Practical- II	2018	<ol style="list-style-type: none"> To separate and determine the two component mixtures To acquire knowledge in the preparation of metal complexes
	CHE-205	Organic Practical-II	2018	<ol style="list-style-type: none"> To familiarize with binary mixture separation and to gain hands-on-experience in purification of the To get knowledge about the chemical behavior of different components and mechanisms.

	CHE-206	Physical Practical -II	2018	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsagar equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry.
	CHE-207	General Chemistry-II	2018	<ol style="list-style-type: none"> 1. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and 2. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
	CHE-208	Human Values and Professional Ethics – II	2018	<ol style="list-style-type: none"> 1. To understand the concepts of human values, responsibilities of family values and status of women in family and society. 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 4. To familiarize environmental ethics, ethical theory and ecological crisis
	CHE-EC-301	Physical Chemistry III	2018	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_{2V} point group based on 3N Coordinates and to learn the Mutual exclusion Principle 2. To learn the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy

				4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
	CHE-EC-302	Spectroscopy Applications	2018	<ol style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE-EC-303	Water Analysis	2018	<ol style="list-style-type: none"> 1. To get an idea about water analysis 2. To understand the basic principles of soil analysis 3. To familiarize with instrumentation of potentiometric techniques 4. To gain knowledge on flame photometry and its applications
	CHE-EC-304	Instrumental Methods of Analysis-I	2018	<ol style="list-style-type: none"> 1. To get an idea about water analysis 2. To understand the basic principles of soil analysis 3. To familiarize with instrumentation of potentiometric techniques 4. To gain knowledge on flame photometry and its applications
	CHE-305	(a) Organic Chemistry III (b) Inorganic Spectroscopy & Thermal	2018	305 A <ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules.

		<p>Methods of Analysis</p> <p>(c) Green Chemistry</p>		<ol style="list-style-type: none"> 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds. <p>305 B</p> <ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry. 2. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 3. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy
	CHE-306	<p>(a) Spectral Techniques or (b) Chromatographic Techniques</p>	2018	<p>306 A</p> <ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques. 3. To Understand the applications of AAS. 4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups <p>306 B</p>

				<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques. 2. To familiarize applications of different chromatographic methods 3. To Understand the principle of chromatographic techniques 4. To gain knowledge on the normal phase and reverse phase
	CHE-EC-401	Water pollution Monitoring and Environment laws	2018	<ol style="list-style-type: none"> 1. Know about nuclear fission and fusion, uses of solar energy in space heating and water heating, hydropower and water heating, hydropower and production of ethanol from indirect solar energy. 2. Learn physical and chemical properties of water and water complexation in natural and waste water and to understand about global warming, ozone depletion, green house effect and acid rains. 3. Acquire knowledge on composition of inorganic and organic contaminants in soil, soil corrosion and industrial applications of green chemistry. 4. Get knowledge on various methods of solid waste collection and its disposal
	CHE-EC-402	Air pollution, control Methods- Noise and Thermal pollution	2018	<ol style="list-style-type: none"> 1. Acquire knowledge on disease causing agents in water 2. Learn about the removal of suspended and dissolved solids present in waste water 3. Understand different uses of micro-organisms in environmental protection 4. Know different world life acts such as forest conversion act, water control pollution act and air prevention and control act
	CHE-EC-403	Instrumental Methods of analysis-II	2018	<ol style="list-style-type: none"> 1. To know the basic principles of conductometry and analysis of acids and halides. 2. Colorometric estimation of iron and manganese. 3. To have an idea about working principles of IR, AAS,

				Spectrofluorimetry, Gas chromatography and HPLC. 4. Tofamiliarize with interpretation of data
	CHE-EC-404	Project work	2018	<ol style="list-style-type: none"> 1. To identify research problem, propose the hypothesis and to collect literature. 2. To perform research designs & experiments 3. To tabulate research result. 4. To conclude research outcomes in the form of dissertation
	CHE-405	<p>(a) Energy, Environment and Soils</p> <p>(b) Bioinorganic, Bioorganic & Biophysical</p> <p>(c) Chemistry of Nanomaterials & Functional materials</p>	2018	<p>405 A</p> <ol style="list-style-type: none"> 1. Acquire knowledge on air pollutants, air pollution sampling measurements and analysis caused due to sulphur dioxide, carbon monoxide, nitrogen dioxide, oxidants, ozone, hydro carbons and particulate matter. 2. Learn about different control methods and adsorption of solids and liquids, gas analysis eluents viz., nitrogen oxides, carbon monoxide and hydrocarbons. 3. Understand pollution caused by vehicle emission, different industries, cement plants, steel mills and petroleum refineries. 4. Know about noise and thermal power project pollutions and their effect on human health. <p>405 B</p> <ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes. 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally. 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters

	CHE-406	(a) Drug Chemistry or (b) Electroanalytical Techniques	2018	<p>406 A</p> <ol style="list-style-type: none"> 1. Know about natural products. 2. Know Interpretation of cardiovascular drugs. 3. Know the Analyzing about prostaglandins. 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs <p>406 B</p> <ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry. 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes.
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M.Sc., Inorganic Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	CHE-101	Inorganic Chemistry- I	2018	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions 4. To gain knowledge on synthesis and structures of

				different metal carbonyls, synergistic effect and 18 electron rule.
	CHE-102	Organic Chemistry I	2018	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents. 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
	CHE-103	Physical Chemistry- I	2018	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics 2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories 3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties. 4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification
	CHE-104	Inorganic Practical- I	2018	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets

				<p>analytical data and will make scientific claims that are supported by the observations.</p> <p>2. To familiarize with techniques of titration and calculation of errors</p>
	CHE-105	Organic Practical-I	2018	<p>1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups</p> <p>2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules</p>
	CHE-106	Physical Practical I	2018	<p>1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different</p> <p>2. To calibrate the statistical data</p>
	CHE-107	General Chemistry-I	2018	<p>1. To know about mean and median values, standard deviation and coefficient of variation.</p> <p>2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS</p>
	CHE-108	Human Values and Professional Ethics – I	2018	<p>1. To know about the needs and importance of professional ethics.</p> <p>2. To analyze nature of Values, basic Moral Concepts character and Conduct</p> <p>3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya.</p> <p>4. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics</p>

CHE-201	Inorganic Chemistry- II	2018	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams. 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods. 4. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods.
CHE-202	Organic Chemistry -II	2018	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E_1, E_2 and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments. 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions. 4. To understand the structural elucidation and synthesis of alkaloids using specific reagents
CHE-203	Physical Chemistry- II	2018	<ol style="list-style-type: none"> 1. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems. 2. To learn Gibbs adsorption isotherm, BET equation

				<p>and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants.</p> <p>3. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem.</p> <p>4. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system</p>
	CHE-204	Inorganic Practical- II	2018	<p>1. To separate and determine the two component mixtures.</p> <p>2. To acquire knowledge in the preparation of metal complexes</p>
	CHE-205	Organic Practical-II	2018	<p>1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the</p> <p>2. To get knowledge about the chemical behavior of different components and mechanisms</p>
	CHE-206	Physical Practical -II	2018	<p>1. To study the determination of cell constant and verification of Onsagar equation, strength of strong</p> <p>2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry</p>
	CHE-207	General Chemistry-II	2018	<p>5. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and</p> <p>6. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC</p>
	CHE-208	Human Values and Professional Ethics – II	2018	<p>1. To understand the concepts of human values, responsibilities of family values and status of women in family and society.</p>

				<ol style="list-style-type: none"> 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 4. To familiarize environmental ethics, ethical theory and ecological crisis
	CHE-IC-301	Inorganic Spectroscopy and Thermal Methods of Analysis	2018	<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry 2. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 3. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR. 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy
	CHE-IC-302	Organic Spectroscopy and Applications	2018	<ol style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE-IC-303	Core practical I & II	2018	<ol style="list-style-type: none"> 1. To know the basic principles of instrumental

	and CHE-IC-304	Inorganic Chemistry		<p>methods of analysis.</p> <ol style="list-style-type: none"> 2. To familiarize with the analysis of organometallic complex salts. 3. To Understand the complexity, theory and working principle of colourimetry. 4. To gain knowledge on analysis of organic components
	CHE-305A	Organic Chemistry III	2018	<ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds
	CHE-305B	Physical Chemistry III	2018	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle 2. To learn the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals. 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches,

				<p>selection rules and Vibrational- rotational Raman spectroscopy.</p> <p>4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
	CHE IC 306 A	Spectral Techniques	2018	<ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy. 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques 3. To Understand the applications of AAS. 4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups
	CHE IC 306 B	Chromatographic Techniques	2018	<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques. 2. To familiarize applications of different chromatographic methods 3. To Understand the principle of chromatographic techniques. 4. To gain knowledge on the normal phase and reverse phase
	CHE-IC-401	Coordination compounds, Organo metallic chemistry & Chemistry of non-transition elements	2018	<ol style="list-style-type: none"> 1. To Gain an extensive knowledge about dinitrogen complexes of Ru(II), Os(II), Co(I), Mo(0) and dioxygen complexes of Ir(I) and Rh(I) and on cycloheptatriene and tropylium complexes of oxidative, reductive elimination reactions 2. To understand mechanism, stereochemical aspects and regeneration of catalyst in olefin hydrogenation (Wilkinson's catalyst), olefin oxygenation (Wacker process or Smidt reaction), Olefin hydroformylation and Fischer –Tropsch process.

				<ol style="list-style-type: none"> 3. To study the examples of metal complexes having metal-metal single or multiple bonds and analyse the spectroscopic evidences for the presence of metal-metal bond. 4. To understand the synthesis and structures of boranes, carboranes, borazines, silicates carbides, peroxy compounds and inter halogens, pseudohalides
	CHE-IC-402	Instrumental Methods of Analysis	2018	<ol style="list-style-type: none"> 1. To understand the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF). 2. To understand the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC). 3. To get knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis. 4. To improve the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I⁻ and S²⁻) by using I₂ liberations and Ce⁴⁺ liberation in solutions
	CHE-IC-403	Instrumental Methods of Analysis-II	2018	<ol style="list-style-type: none"> 1. To understand the common laboratory techniques including separation techniques. 2. Polarography, atomic absorption spectroscopy in both emission and absorption mode. 3. To gain knowledge on implementation of gas chromatography and HPLC for separation of mixtures. 4. To Familiarize with interpretation of data to structures by NMR.

	CHE-IC-404	Project work	2018	<ol style="list-style-type: none"> 1. Ability to perform experiments, collection and evaluation of data 2. Interpretation of results while adhering to scientific principles of responsible and ethical behaviour. 3. Analysing and compiling the data and results in a chronological order in the form of dissertation 4. Preparation of dissertation.
	CHE-405	<p>(a) Solid state and Photo Chemistry</p> <p>(b) Bioinorganic, Bioorganic & Biophysical</p> <p>(c) Chemistry of Nanomaterials & Functional materials</p>	2018	<p>405 A</p> <ol style="list-style-type: none"> 1. To understand the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF). 2. To understand the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC). 3. To get knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis 4. To improve the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (Γ and S^{2-}) by using I^2 liberations and Ce^{4+} liberation in solutions. <p>405 B</p> <ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron

				<p>transfer processes.</p> <ol style="list-style-type: none"> 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally. 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters
	CHE-406	(a) Drug Chemistry or (b) Electroanalytical Techniques	2018	<p>406 A</p> <ol style="list-style-type: none"> 1. Know about natural products. 2. Know Interpretation of cardiovascular drugs. 3. Know the Analyzing about prostaglandins. 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs. <p>406 B</p> <ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes

M.Sc., Organic Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	CHE-101	Inorganic Chemistry- I	2018	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes.

				<ol style="list-style-type: none"> 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules. 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions 4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule
	CHE-102	Organic Chemistry I	2018	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions. 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
	CHE-103	Physical Chemistry- I	2018	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics 2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories. 3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process,

				Gibbs- Duhem equation, calculation of thermodynamic properties. 4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification
	CHE-104	Inorganic Practical- I	2018	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations 2. To familiarize with techniques of titration and calculation of errors
	CHE-105	Organic Practical-I	2018	<ol style="list-style-type: none"> 1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups 2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
	CHE-106	Physical Practical I	2018	<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data
	CHE-107	General Chemistry-I	2018	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation. 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS.
	CHE-108	Human Values and Professional Ethics – I	2018	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts

				character and Conduct 3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya. 4. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics
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	CHE-201	Inorganic Chemistry- II	2018	1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions
	CHE-202	Organic Chemistry -II	2018	1. To familiarize the mechanisms of E_1 , E_2 and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the

				<p>effect of electron donating and withdrawing substituents in selectivity of ring opening reactions.</p> <p>4. To understand the structural elucidation and synthesis of alkaloids using specific reagents.</p>
	CHE-203	Physical Chemistry- II	2018	<p>5. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems</p> <p>6. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants</p> <p>7. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem</p> <p>8. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system</p>
	CHE-204	Inorganic Practical- II	2018	<p>3. To separate and determine the two component mixtures</p> <p>4. To acquire knowledge in the preparation of metal complexes</p>
	CHE-205	Organic Practical-II	2018	<p>3. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the</p> <p>4. To get knowledge about the chemical behavior of different components and mechanisms.</p>
	CHE-206	Physical Practical -II	2018	<p>3. To study the determination of cell constant and verification of Onsager equation, strength of strong</p> <p>4. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry.</p>
	CHE-207	General Chemistry-II	2018	<p>3. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and</p>

				4. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
	CHE-208	Human Values and Professional Ethics – II	2018	<ul style="list-style-type: none"> 5. To understand the concepts of human values, responsibilities of family values and status of women in family and society. 6. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 7. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 8. To familiarize environmental ethics, ethical theory and ecological crisis
	CHE-OC-301	Organic Chemistry III	2018	<ul style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds
	CHE-OC-302	Organic Spectroscopy and Applications	2018	<ul style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of

				different molecules which are unique
	CHE OC 303 & 304	Core practical I: Organic Estimations - Practical	2018	<ol style="list-style-type: none"> 1. To gain knowledge about the estimation/percent purity of different organic molecules. 2. To get hands-on-experience with the synthesis and determination of concentrations and purity 3. To acquire knowledge in handling of toxic chemicals in multi step preparation of biologically important 4. To gain experience in the proposal of synthetic routes to functionalized derivatives
	CHE-OC- 305 A	Inorganic Spectroscopy and Thermal Methods of Analysis	2018	<ol style="list-style-type: none"> 1. To know the basic principles of instrumental methods of analysis. 2. To gain knowledge on chemistry of alloys. 3. To Understand the complexity, theory and working principle of colourimetry 4. To familiarize with laws of colorimetric titrations.
	CHE-OC- 305 B	Physical Chemistry III	2018	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_2V point group based on 3N Coordinates and to learn the Mutual exclusion Principle. 2. To learn the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals. 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy. 4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
	CHE OC 306 (A)	Spectral Techniques	2018	<ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques. 3. To Understand the applications of AAS. 4. To gain knowledge about Mass spectral fragmentation of

				organic compounds and common functional groups
	CHE OC 306 (B)	Chromatographic Techniques	2018	<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques 2. To familiarize applications of different chromatographic methods 3. To Understand the principle of chromatographic techniques. 4. To gain knowledge on the normal phase and reverse phase.
	CHE-OC- 401	Organic synthesis I	2018	<ol style="list-style-type: none"> 1. Familiarize with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents 2. Learn about photolytic reactions of carbonyl compounds, conjugated carbonyl derivatives, olefins, conjugated dienes CO₃:To gain knowledge in the determination of allowed or forbidden of chemical reactions viz., cycloaddition and 3. Learn the methods of preparation, properties, and industrial applications of various addition and condensation 4. Familiarize with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents
	CHE-OC 402	Organic Synthesis II	2018	<ol style="list-style-type: none"> 1. Familiarize with functionalization and interconversion of functional groups and the concept of organic synthesis by retrosynthetic approach 2. Gain knowledge in the formulation of synthetic routes for naturally occurring drugs. 3. Understand quinoline, acridine and guanidine group of alkaloids as antimalarials and to familiarize with the role of functioning of broad spectrum antibiotics. 4. Acquire knowledge about the classification, properties, structure & conformation and biological functions of peptides/proteins
	CHE OC 403	Core practical I: Spectral	2018	<ol style="list-style-type: none"> 1. Calculate λ max values. 2. Ascertain functional groups.

		Identification of Organic Compounds		<ol style="list-style-type: none"> 3. Interpret the spectral data to the structure and stereochemistry of the molecules. 4. Analyse the fragmentation pattern of the molecules.
	CHE OC 404	Practical II: Project Work	2018	<ol style="list-style-type: none"> 1. Identify the problem, to collect the literature and understanding parameters to design the problem. 2. Perform experiments to synthesize the molecules with desired stereochemistry adopting modern techniques 3. Collect and interpretation of the data to the structures 4. Presentation of the data in the form of dissertation
	CHE-OC-405A	Heterocycles and Natural Products	2018	<ol style="list-style-type: none"> 1. Familiarize with the synthetic routes of five membered heterocycles with two heteroatoms and to justify the site of 2. Acquire knowledge on the synthetic methodologies of benzofused and six membered heterocycles and the effect of 3. Familiarize with the structural elucidation and synthesis of naturally occurring steroids and hormones 4. Know about isolation, structural determination and synthesis of flavonoids and isoflavonoids
	CHE-OC-405B	Bioinorganic, Bioorganic, Biophysical Chemistry	2018	<ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes. 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally. 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters
	CHE OC 406A	Drug Chemistry	2018	<ol style="list-style-type: none"> 1. Know about natural products 2. Know Interpretation of cardiovascular drugs. 3. Know the Analyzing about prostaglandins 4. Know the Definition, Classification, Nomenclature,

				Structure and Synthesis of anti-inflammatory drugs.
	CHE OC 406B	Electroanalytical Techniques	2018	<ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes

M.Sc., Physical Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CHE-101	INORGANIC CHEISTRY I	2018	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules. 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions. 4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.
2	CHE-102	Organic Chemistry I	2018	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions. 2. To ascertain the stereochemistry of the products with the effect of neighbouring group

				<p>participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents</p> <ol style="list-style-type: none"> 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
3	CHE 104	Core practical I: Inorganic Chemistry	2018	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations 2. To familiarize with techniques of titration and calculation of errors
4	CHE 105	Core practical I: Organic Chemistry	2018	<ol style="list-style-type: none"> 1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups 2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
5	CHE 106	Core practical I: Physical Chemistry	2018	<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data

6	CHE-107	General Chemistry I	2018	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS
7	CHE 108	Human Values and Professional Ethics-I	2018	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts character and Conduct 3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya. 4. To understand values of Bhagavd Gita, various – 5. /*religions, religious tolerance, Gandhian ethic--

	CHE - 201	Inorganic Chemistry II	2018	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions
	CHE-202	Organic Chemistry II	2018	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E₁, E₂ and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments. 2. To learn the rearrangements involving electron

				<p>deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions.</p> <ol style="list-style-type: none"> To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions. To understand the structural elucidation and synthesis of alkaloids using specific reagents
	CHE -203	Physical chemistry II	2018	<ol style="list-style-type: none"> To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system
	CHE 204	Core practical I: Inorganic Chemistry	2018	<ol style="list-style-type: none"> To separate and determine the two component mixtures. To acquire knowledge in the preparation of metal complexes

CHE 205	Core practical II: Organic Chemistry	2018	<ol style="list-style-type: none"> 1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the 2. To get knowledge about the chemical behavior of different components and mechanisms
CHE 206	Core practical II: Physical Chemistry	2018	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsager equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry
CHE-207	General Chemistry II	2018	<ol style="list-style-type: none"> 1. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and 2. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
CHE 208	Human Values and professional ethics-II	2018	<ol style="list-style-type: none"> 1. To understand the concepts of human values, responsibilities of family values and status of women in family and society. 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management 4. To familiarize environmental ethics, ethical theory and ecological crisis
CHE-PC-301	Physical Chemistry III	2018	<ol style="list-style-type: none"> 1. To know the determination of Character Coordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle

				<ol style="list-style-type: none"> 2. To learn the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy 4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
	CHE-PC 302	Organic Spectroscopy and Applications	2018	<ol style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds. 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE PC 303 & 304	Core practical I: Physical Chemistry-practicals I & II	2018	<ol style="list-style-type: none"> 1. To study chemical kinetics of homogeneous solutions 2. To gain knowledge on the determination of different cations by flame photometry 3. To understand the principle and working aspects of conductometric titrations 4. To acquire knowledge on the implementation of colorometric estimations 5. To study chemical kinetics of homogeneous solutions

	CHE PC 305 A	Organic Chemistry III	2018	<ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.
	CHE-PC-305 B	Inorganic Spectroscopy and Thermal Methods of Analysis	2018	<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry. 2. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR 3. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron
	CHE PC 306 A	Spectral Techniques	2018	<ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy. 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques. 3. To Understand the applications of AAS 4. To gain knowledge about Mass spectral

				fragmentation of organic compounds and common functional groups
	CHE PC 306 B	Chromatographic Techniques	2018	<ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques. 2. To familiarize applications of different chromatographic methods. 3. To Understand the principle of chromatographic techniques 4. To gain knowledge on the normal phase and reverse phase
	CHE-PC-401	Electrochemistry	2018	<ol style="list-style-type: none"> 1. Know the techniques of deposition of metals, throwing power simultaneous discharge of cations and methods of corrosion protection 2. Learn about electrochemical Batteries, fuel cells and nickel-cadmium batteries 3. Understand electrical double layer systems, sedimentation potential, null points of metals and zeta potential 4. Calculate electrochemical parameters; familiarize mixed ligand systems and reversible systems
	CHE-PC 402	Thermodynamics, Polymers and Solid-state Chemistry	2018	<ol style="list-style-type: none"> 1. Derive Gibbs Duhem equation and to calculate fugacity and chemical potential 2. Calculate excess free energy and entropy, to draw Hildebrand curves and to correlate excess functions and activity coefficients 3. Learn morphology, T_m and T_g points and to calculate transition temperatures and to identify cross linking in polymers 4. Identify magnetic properties of solids, magnetic

				materials, superconductors and BCS theory
CHE PC 403	Core practical I: Inorganic Chemistry - Practical	2018		<ol style="list-style-type: none"> 1. To perform titration of mixture of halides and to draw potentiometry curves 2. To learn amperometric titrations and mixtures by polarography 3. To Correlation of data obtained from IR, AAS, HPLC and GC 4. To Determination of alkalinity and purity by pH metry
CHE PC 404	Project Work	2018		<ol style="list-style-type: none"> 1. To identify research problems and to collect research literature 2. To propose hypothesis of a research problem 3. To perform research experiments 4. To analyse the data and conclude the research outcomes
CHE-PC-405A	Chemical Kinetics	2018		<ol style="list-style-type: none"> 1. Draw skrabal pH diagram and to separate unimolecular and bimolecular reactions 2. Study laws of photochemistry, to derive stern-volmer equation 3. Identify chromo potentiometry points and to investigate kinetic currents and isotopic effects 4. Learn photochemical thresholds, chemiluminescence
CHE-PC-405B	Bioinorganic, Bioorganic, Biophysical Chemistry	2018		<ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective

				<p>synthesis of organic compounds and drugs by adopting environmentally</p> <p>4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters</p>
	CHE PC 406A	Drug Chemistry	2018	<ol style="list-style-type: none"> 1. Know about natural products. 2. Know Interpretation of cardiovascular drugs 3. Analyzing about prostaglandins. Know the 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs
	CHE PC 406 B	Electroanalytical Techniques	2018	<ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes

33. Environmental Sciences

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ENV-101	Ecology and Environment	2018	<ul style="list-style-type: none"> • Provide solutions to environmental problems using appropriate tools and techniques. • Develop both a quantitative and qualitative understanding of interactions between organisms and their consequences. • Gain the knowledge of functions of organisms and ecosystem.
2	ENV -102	Environmental Chemistry	2018	<ul style="list-style-type: none"> • Demonstrate knowledge of chemical and

				<p>biochemical principles of fundamental environmental processes in air, water and soil.</p> <ul style="list-style-type: none"> • Apply basic chemical concepts to analyze chemical processes involved in different environmental problems. • By knowing pollution levels in the environment best possible fresh environment can be created in different methods like afforestation, natural parks and sanctuaries etc., for human concern.
3	ENV-103P	Practical – I	2018	<ul style="list-style-type: none"> • Imparting practical knowledge about estimation of pH, Total Dissolved Solids, Hardness and Dissolved Oxygen, Chlorides and Sulphates in water samples.
4	ENV-104P	Practical-II	2018	<ul style="list-style-type: none"> • Understanding of various alkalinities present in the water sample by volumetric titration linked with theory. • By knowing water pollution potable water can be drawn out and wastewater can be treated. • By knowing various fertility of the soil can be known which is advantage to farmers for agriculture.
5	ENV-105	Environmental Toxicology and Public Health	2018	<ul style="list-style-type: none"> • To understand the role of toxicants in environment, methods used to quantify toxicity, regulations that govern toxic substances and assessment of risks posed by exposure to toxicants. • Inform, educate, and empower people about the potential hazards of toxic substances to environmental and human health. • By knowing the adverse health problems on

				human beings, safety, preventing measures can be implemented endemic and pandemic diseased can be controlled.
6.	ENV-106	Human Values and Professional Ethics-I	2018	<ul style="list-style-type: none"> • Describe the human values, understand the commitment and responsibility. • They gain the ability to bring harmony to the society. • By studying human values reformation of man and reformation of policy shall be done and harmony of environment and society also can be achieved.
8.	EN-201	Energy and Environment	2018	<ul style="list-style-type: none"> • Explain the key challenges and technologies in energy use, utilization of energy resources, energy conversion and environmental consequences. • They explain basic competence regarding environmental impacts arising from different energy carriers and technical solutions. • Enrichment of ecosystem will be achieved.
8.	ENV-202	Environmental Pollution	2018	<ul style="list-style-type: none"> • Analyze sources of pollution, exposure pathways, fate and evaluate consequences of human exposure to pollution and its impacts to environmental quality. • Distinguish the effect of pollutants on human health, economy and wild environments. • Pollution free environment for human life will be achieved.
9.	ENV-203P	Practical-I	2018	<ul style="list-style-type: none"> • Describe the amount of pesticide/insecticide in water/vegetable samples.

				<ul style="list-style-type: none"> • To find concentration levels of toxicant by use of instrumental techniques • To estimate physicochemical assessments in different water samples
10.	ENV-204P	Practical-II	2018	<ul style="list-style-type: none"> • Identify the concentration of biochemical by using instrumental methods. • To find an amount of LC50 of various metals in organism. • To estimate the growth rate of fauna at various habitat condensations.
11	ENV-205	Instrumental Techniques and Applications	2018	<ul style="list-style-type: none"> • Integrate a fundamental understanding of the underlining physics principles as they relate to specific instrumentation used for atomic, molecular, and mass spectrometry, magnetic resonance spectrometry and chromatography. • Environmental potentiality will be achieved. This is indirect benefits to the society. • To understand the analysis and level of concentration of different metals through instrumental techniques.
12	ENV-206	Human Values and Professional Ethics-II	2018	<ul style="list-style-type: none"> • Understand the core values that shape the ethical behaviour. • An ability to apply their broad education towards the understanding of the impact of engineering solutions in a global and societal context. • Making the students to full man, understanding the ethical values.
13	ENV -301	Waste Treatment and Management	2018	<ul style="list-style-type: none"> • Describe the components of solid waste

				<p>management and the laws governing it.</p> <ul style="list-style-type: none"> • Discuss the solid waste collection systems, route optimization techniques and processing of solid wastes. • Biodegradation of waste through natural and artificial methods will be achieved.
14	ENV -302	Environmental Assessment, Audit and Economics	2018	<ul style="list-style-type: none"> • Explain the concepts about the Environmental Impact Assessment (EIA) and describe the environment laws, aims and the necessity of EIA. • Critically examine assumptions inherent in impact assessment, examine a range of environmental impact assessments and identify and explore impact assessment fields and approaches. • Understand the sustainable development and controlling environmental pollution.
15	ENV -303	Practical-I	2018	<ul style="list-style-type: none"> • Understand the degradation of natural resources by constructions of various projects. • Understand requirement of oxygen for growth of organisms to break down organic matter in wastewaters. • Describe the low cost wastewater treatment practices in water demand areas.
16	ENV-304	Practical-II	2018	<ul style="list-style-type: none"> • It helps to explain the relationships between variables of the real-world applications. • Develop the programming techniques and the problem solving skills through programming.
18	ENV-305A	Ecotourism and Eco-restoration	2018	<ul style="list-style-type: none"> • Describe the challenging in Eco-Tourism and wildlife tourism.

				<ul style="list-style-type: none"> • Understand values of wildlife and minimizing impact on natural ecosystem due to tourism. • It is joyful to public and society; Government economy also will be generated. • Understand the mitigation approaches, their choices and alternatives.
18	ENV-305B	Biodiversity Conservation and Management	2018	<ul style="list-style-type: none"> • Systematically understand biodiversity and its vital role in ecosystem function. • Understand the value of biodiversity and current threats to biodiversity. • Describe Environment of nature
19	ENV-305C	Statistics, Computer Applications and Modeling	2018	<ul style="list-style-type: none"> • Analyze data using standard statistical techniques. • Utilize the Internet Web resources and evaluate on-line e-business system. • Environmental analysis, forecasting of the environment can be achieved.
20	ENV-306A	Natural Resources Conservation	2018	<ul style="list-style-type: none"> • Apply theories and methods with interdisciplinary approach towards natural resource management. • Critically examine the gap in the resource availability, use and conservation. • In conservation of the environment, employment can be generated.
21	ENV-306B	Global Environmental Issues	2018	<ul style="list-style-type: none"> • Predicting the consequences of human actions on the web of life, global economy and quality of human life. • Developing critical thinking for shaping strategies (scientific, social, economic and

				<p>legal) for environmental protection and conservation of biodiversity, social equity and sustainable development.</p> <ul style="list-style-type: none"> • International issues will be understood.
22	ENV-401	Water Resources and Watershed Management	2018	<ul style="list-style-type: none"> • Understand water's importance as a precious resource. • Provide a basic understanding of the impact of water and water-related issues in a global, economic, environmental and societal context. • Describe the management of water resources through construction of watersheds for future generations.
23	ENV-402	Remote Sensing and GIS	2018	<ul style="list-style-type: none"> • Building a foundation for understanding Remote Sensing and Geographic Information System (RS-GIS) as a powerful tool for geospatial analysis. • Appreciate the application of RS-GIS techniques to the matrices of environment and Resource management. • Future predictions of the environment will be known about weather, cyclones and research etc.,
24	ENV-403	Practical-I	2018	<ul style="list-style-type: none"> • Analyze the multi elements in various wastewater samples. • Understand the rain water harvesting practices. • Identify the water bodies and evaluate effective sensors and advance technique to extract and mapping the features for various

				applications.
25	ENV-404	Project Work and Comprehensive Viva-Voce	2018	<ul style="list-style-type: none"> • Understand project characteristics and various stages of a project. • Estimate and cost the human and physical resources required and make plans to obtain the necessary resources. • It helps to develop in contextualization of knowledge; critical thinking and can lead to new innovation ideas.
26	ENV-405 A	Disaster Mitigation and Management	2018	<ul style="list-style-type: none"> • Develop foundations for hazard, risk and vulnerability assessment. • To assess review and control the risk.
28	ENV-405 B	Environmental Laws, Policies and Legislation	2018	<ul style="list-style-type: none"> • Understanding judicial response to environmental issues in India. • Acquire the ability to evaluate the role of law and policy in conservation and management of natural resources and prevention of pollution.
28	ENV-405 C	Environmental Education	2018	<ul style="list-style-type: none"> • Demonstrate an integrative approach to environmental issues with a focus on sustainability. • Communicate complex environmental information to both technical and non-technical audiences. • Students will be enriched about the nature.
29	ENV-406 A	Forest Resources and Management	2018	<ul style="list-style-type: none"> • Demonstrate knowledge of forest vegetation modeling and the ability to forecast its development over time using models of forest growth. • Integrate knowledge of basic biology, physical

				<p>sciences, forest and wildlife ecology, and social sciences into the stewardship of forest resources.</p> <ul style="list-style-type: none"> • Through forest management national economy will be improved.
30	ENV-406 B	Environmental Management and Sustainable Development	2018	<ul style="list-style-type: none"> • Ability to analyze environmental management in relation to the major principles of sustainable development. • The ability to work effectively to create environmental management analysis outputs of professional quality, both independently and within team environments.

34. Fishery Sciences & Aquaculture

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	AQC 101	Concepts of Aquatic Ecology	2018	<p>i. Understanding the General Characteristics, Principles of classification, Aquatic EcologyCommunities.</p> <p>ii. To understand the various Physical and chemical characteristics of water.</p>
2	AQC 102	Systematics And External Anatomy of Cultivable Organisms	2018	<p>i. Understand the concepts of finfish and shellfish systematics and anatomy.</p> <p>ii.</p> <p>iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations,</p>

				<p>Natural Selection and Genetic drift.</p> <p>iv. Understood the concepts of Micro, Macro evolution speciation categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.</p>
3	AQC 103 A	Fish Nutrition and Water Quality Management	2018	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. Understanding the comparative aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in taxonomy related research and job opportunities.</p> <p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p>
4	AQC: 103 B	Environmental Monitoring and Bio deterioration	2018	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight into biological</p>

				<p>processes.</p> <p>iv. Understood that the four propositions underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
5	AQC- 104A	Coastal Aquaculture	2018	<p>i.The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p>
6.	AQC 104 B	: Ornamental Fish Culture	2018	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita</p>

				and its applications in uplifting of Religious values in the present society.
			2018	
7.	Practical-1 AQC 105	Identification and Morphology of Cultivable Organisms	2018	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the ultra-structural information of animal cell besides the detailed views of the cell interior revealing the various events and actions of cell at the molecular level.</p> <p>iii. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the principles of Graft rejection, Auto immunity and Antibody based therapy.</p>
8.	Practical-2AQC106	Fish Nutrition	2018	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p> <p>ii. Students world gain expertise in understanding the complex molecular mechanisms occurring in</p>

				<p>cell and the applications of molecular technologies for betterment of life.</p> <p>iii. Understand and our apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the health Professions.</p>
9.	AQC 107	Human Values and Professional Ethics – I	2018	<p>i. Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they will also know the various tools and techniques related to bacterial microbiology.</p> <p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p>
10.	AQC 201	Principles of Aquaculture	2018	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fullest.</p> <p>iii. Learn the fundamental principles of immune</p>

				<p>response including molecular, biochemical and cellular basis of immune homeostasis.</p> <p>iv. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.</p>
11	AQC 202	Physiology of Cultivable Organisms	2018	<p>i. In depth understanding of Anatomical features of Integumentary, Circulatory, Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.</p> <p>ii. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>iii. An appropriate understanding of functioning of each system of different groups of animals with their comparison will be acquainted.</p> <p>iii. Understanding of the basic concepts of Physiological regulation, from cellular to organ to organismal.</p> <p>iv. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet.</p>
12	AQC 203A	Fresh Water Aquaculture	2018	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be</p>

				performed by Humans to lead a good and Peaceful life.
13	AQC 203B	Capture fisheries	2018	<p>i. Students would gain expertise in explaining how a variety of interacting processes generate an organism's heterogenous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p> <p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity complex and coordinated systems in organisms the students can apply this knowledge for research, and education, to solve the problems related to development in animals through research.</p>
14	AQC 204 A	Fishery Economics, Extension and Environmental Management	2018	<p>i. Students will be able to apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.</p> <p>ii. Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.</p> <p>iii. Students will be able to be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p> <p>iv. Students will be able to use technology, such as geographical information systems and computer programming, to assist in problem solving.</p>
15	AQC 204 B	Limnology	2018	<p>i. Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific</p>

				<p>reasoning exhibited in experimental life sciences. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>iv. Students would gain basic knowledge of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study and understanding of life processes.</p>
16	Practical-1 AQC205	Soil and Water Characteristics	2018	<p>i. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to Education, Research and Extension programmes in his further career.</p> <p>ii. Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>iii. Students learn about enzymes. Their classification and nomenclature</p> <p>iv. Students learn about specificity of enzymes</p>

				<p>v. Students learn about measurement of enzymatic activity</p> <p>vi. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.</p>
17	Practical-2 AQC206	Physiology of Fin Fish and Shell Fish	2018	<p>i. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>ii. Identify and describe the different equipment and tools used in a biology laboratory.</p> <p>iii. Correctly operate different laboratory instruments.</p> <p>iv. Correctly operate different types of microscopes.</p> <p>v. Prepare tissue for section cutting and correctly operate a microtome.</p>
18	AQC 206	Human Values and Professional Ethics – II (Audit course)	2018	<p>i. Students gain knowledge about regulation of enzyme activity with respective mechanisms</p> <p>ii. To understand about mechanism of enzymes in clinical diagnosis and their applications</p> <p>iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.</p>
19	AQC 301	Microbiology and Fish Pathology	2018	<p>i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology.</p> <p>ii. Describe different methods of data handling using computer.</p> <p>iii. Perform basic operations of gene sequence retrieval and compare them using different software.</p> <p>iv. Perform basic operations of protein structure retrieval and comparison using different software.</p>

				<p>v. The student will learn about the Computer basics like Operating systems, Programming, Data Access, Internet and Nucleic acid Sequence and Protein Data Banks.</p> <p>vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of dispersion like Mean deviation and Standard deviation and Co-efficient of Variation.</p> <p>v. The course will aid in learning Test of significance like Null hypothesis and Alternative hypothesis, t-test, F-test, Chi-square test, Correlation and Regression analysis.</p>
20	AQC 302	Fish Immunology	2018	<p>i. Creating the self-employment opportunities to rural students through Animal husbandry, Aquaculture, Vermiculture and Sericulture.</p> <p>ii. To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices.</p> <p>iii. Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.</p>
21	AQC: 303A	Cell Biology and Genetics	2018	<p>i. To understand the different pathogens causing disease in man.</p> <p>ii. Describe the different parasites causing disease and disability in man and animals.</p> <p>iii. Ability to elaborate about the life cycle and biology of disease carrying vectors; suggest preventive and control measures for the said diseases.</p> <p>iv. An understanding of the relationship between changes in physiology of host and</p> <p>v. The students after completion of the course based</p>

				on the Expertise he/she may join as Parasitological Scientist.
22	AQC 303 B	Bioinformatics In Aquaculture	2018	<p>i. Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment</p> <p>ii. Explain the importance of environmental audits and other management tools in business for social benefit by improving environmental performance</p> <p>iii. Calculate the carbon footprint of any organization and identify suitable mitigation strategies for carbon reduction solutions.</p>
23	Practical's AQC 304	Microbiology and Fish Diseases	2018	<p>i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials</p> <p>ii. Students learnt and gain knowledge on structure and function of different types of Synapses</p> <p>iii. Gained information on different types of Neurotransmitters i.e. Amino acids and Peptides.</p>
24	Skill oriented course AQC 305	Fish Nutrition Technology	2018	<p>i. The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research.</p> <p>ii. Understanding of the physiological and genotoxic effects of drugs and environmental toxins.</p> <p>iii. To understand various types of insecticides and understand their mode of action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible with other control strategies.</p> <p>iv. The students will learn handling of the</p>

				pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.
25	Open Elective (For other department students)	<p>a)AQC 306A: Fish Processing Technology</p> <p>b) AQC306B: Pollution and Toxicology</p>	2018	<p>i. Learnt about structure, function and organization of Neurons in the Central nervous system</p> <p>ii. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials.</p> <p>iii. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny.</p> <p>iv. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effective communicate with both specialist and non-specialist audiences/community.</p>
26	AQC 401	Aquaculture Biotechnology	2018	<p>i. Skill development in environmental and occupational Toxicology.</p> <p>ii. It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain.</p> <p>iii. Identification of different routes of exposure of environmental toxins.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p> <p>v. To understand the overview of Animal Behavior and prominence of social organization in insects</p>

				<p>and primates.</p> <p>vi. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>vii. To understand how to conserve the wild animals</p>
27	AQC402	Essentials Of Biochemistry	2018	<p>i. Understanding of in vitro culturing of organisms and production of transgenic animals.</p> <p>ii. Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors.</p> <p>iii. This insight allows students to take into consideration about ethical issues involved in production of transgenic animals and BT products.</p> <p>iv. Use in gene transfer technology, genetic manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p> <p>v. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny</p> <p>vi. Classify the nutritional types of microorganisms and measure microbial growth</p> <p>vii. Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>viii. Assess impact of plant- microbe interaction on agriculture in both beneficial and detrimental ways. Identify industrially important microbes.</p>
28	AQC403A	Computer Applications, Information Technology And Biostatistics In Aquaculture	2018	<p>i. Understand the overview of Animal Behavior and prominence of social organization in insects and primates</p> <p>ii. Gained lot of information on different types of</p>

	AQC403B	Aquaculture Engineering		<p>Learning phenomenon and their mechanisms.</p> <p>iii. To understand the how to conserve wild animals and management strategies.</p> <p>iv. To gain the knowledge about wild animals and animal products importance.</p>
29	Practical's AQC 404	Biotechnology And Biochemical Estimations	2018	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic pathways.</p> <p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
30	Multidisciplinary course/ project work AQC405	Project Work / Fieldwork	2018	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p> <p>ii. Students will be able to perform basic genetic engineering experiments at the end of course.</p> <p>iii. Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.</p>
31	Open Elective (For other department students) AQC 406(A)	General Principles and Practices of Aquaculture	2018	<p>i. Understand the evolution of protein structural motifs and domains and associate this with function;</p> <p>ii. Use on-line structural databases and tools to predict the properties, structure and function of proteins.</p> <p>iii. Understand and explain enzyme mechanisms in a structural context.</p>

				<p>iv. Describe mechanisms of protein folding and the roles of natively unstructured proteins in biology.</p> <p>v. Understand how cross-talk between proteins and post-translational protein modifications (e.g. phosphorylation, ubiquitination) facilitate information processing in cells.</p>
32	AQC 406 (B)	Fish Breeding and Hatchery Management	2018	<p>i. To understand the basic concepts of Infectious diseases and the role of immunity to control infections</p> <p>ii. Provides knowledge on the physiological mechanisms leading to diseased conditions.</p> <p>iii. Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv. This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>

35. Geography:

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	GEG-101	Geomorphology	2018	<ul style="list-style-type: none"> To understand the concept of place and how it is connected to people's sense of belonging to the physical environment, landscape and culture. To understand the fundamental concepts of spatial interaction and diffusion, which explain how human activities are influenced by the concept of distance. To exposed to the nature of physical systems such as geomorphologic processes and natural hazards. To read and interpret information on different types of physical features maps. To learn how human, physical and environmental components of the world interact.

2	GEG-102	Economic Resource Studies	2018	<ul style="list-style-type: none"> • To acquire knowledge about the concepts of resources, classification, models of natural resource processes, their use and misuse, conservation and management of resources for sustainable development • To Provide a comprehensive introduction to basic concepts and key theoretical approaches in economic geography • To Introduce economic geography as a dynamic, diverse and contested body of knowledge • To enable you to apply this knowledge to key social and economic issues in the context of economic globalization
3	GEG-103P	Maps Scales and Map Projections	2018	<ul style="list-style-type: none"> • To apprise the students about the art and science of mapmaking and representation. • To explain the usage of different types of projections • To focus on the importance of scale and projection in the process of representing the earth's surface
4	GEG-104P	Terrain Mapping Techniques	2018	<ul style="list-style-type: none"> • To apprise the students about the Terrain mapping techniques • To project the representation of the landforms by using contour lines • To explain the methods of slope analysis • To develop the knowledge on the thematic maps • To Understand the data representation through the diagrammatic form and logographs
5	GEG-105	Advanced Cartography	2018	<ul style="list-style-type: none"> • To apprise the students to various aspects of cartography. • To introduce the basic concepts and key theoretical approaches in Advanced Cartography. <p>To describe the art and science of mapmaking and map analysis</p>
6.	GEG-106	Human Values and Professional	2018	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and</p>

		Ethics-I		Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society
7.	GEG-201	Climatology and Oceanography	2018	<ul style="list-style-type: none"> • To introduce to the students the fundamentals of atmospheric phenomena, global climate systems and climate change. • The atmosphere and climate are a critical part of the earth system, and climatic variability and change are central to the issue of current and future global environmental change. • To grasp the techniques for modeling the climate, covering both the theoretical and technical aspects. • To understand the dynamics of the atmosphere and the overall climatological system. • To be able to analyse and interpret climatic data and classification of climate
8.	GEG-202	Principles of Remote Sensing	2018	<ul style="list-style-type: none"> <input type="checkbox"/> To focus on history and evolution of Remote sensing. <input type="checkbox"/> To explain the principle involved in remote sensing i.e. the Electromagnetic spectrum, reflection, refraction, diffusion, absorption and interaction with the earth's atmosphere. <input type="checkbox"/> To give the technical knowledge of satellite system. <input type="checkbox"/> To provide knowledge on the platforms and instruments used for remote sensing. <input type="checkbox"/> To give light on Aerial Remote sensing and satellite Remote sensing. <p>To explain about the specifications of sensors</p>
9.	GEG-203P	Interpretation of topographical and Weather Maps	2018	<ul style="list-style-type: none"> • To provide understanding and interpretation Skills of different Topographical maps. • To improve the knowledge on Indian weather maps and Interpretation skills.
10.	GEG-204P	Techniques of	2018	<ul style="list-style-type: none"> • To apprise the students about the Terrain mapping techniques

		Mapping and Map Analysis		<ul style="list-style-type: none"> • To project the representation of the landforms by using contour lines • To explain the methods of slope analysis • To develop the knowledge on the thematic maps
11	GEG-205	Geographical Thought	2018	<ul style="list-style-type: none"> • To acquaint the students with the Geographical philosophy and the Methodology and historical development of geography as a professional field. • The idea is to address the spirit and purpose of the changing geographies and to what we as geographers contribute towards knowledge production. • To develop critical thinking and analytical approaches and Students will acquire an understanding of and appreciation for the contributions of the eminent geographers to the subject.
12	GEG-206	Human Values and Professional Ethics-II	2018	<p>Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	GEG-301	Urban Studies	2018	<ul style="list-style-type: none"> • To deal with the concept of urban settlements and evolution of urban population and to provide concept of Urban studies. • To explain the cause and effects of growth in urban population. • To explain the theories involved in classifications of towns and relationship between towns and cities and their population. • To understand patterns of World urbanization with reference to India

14	GEG-302	Geographical Information System(G.I.S)	2018	<ul style="list-style-type: none"> • To understand the evolution of GIS. • To focus on collection, analyzing, interpretation and presenting the data related to Earth. • To explain the types of data collection with respect to time and terrain and Database management and retrieving the data from different sources. • To provide the theoretical knowledge on the Modeling surfaces and integration of Remote sensing with GIS. • To provide knowledge on GIS applications in different sectors.
15	GEG-303P	Geographical Information System(G.I.S)	2018	<ul style="list-style-type: none"> • To acquaint knowledge about especially Geographic Information System(GIS) softwares. • To develop the skill of geo-referencing and creation of different data files. • To improve the practical knowledge on attributed data and linkage. • To develop the skill on analysis methods of GIS.
16	GEG-304P	Statistical Techniques	2018	To analyze and represent the geographical data
17	GEG-305A	Agricultural Studies	2018	<ul style="list-style-type: none"> • To focus on evolution of Agriculture through the different ages and approaches. • To understand the concepts and importance of determinants in different cropping patterns. <p>To understand agricultural allocation theories also the problem and prospects of Indian Agriculture</p>
18	GEG-305B	Regional Geography of India with special reference to Andhra Pradesh	2018	<ul style="list-style-type: none"> <input type="checkbox"/> To develop the understanding about physical features of Indian Geography. <input type="checkbox"/> To familiarize the students with physiography, Drainage, Climate, soil and natural vegetation of India.

19	GEG-305C	Disaster Management Studies	2018	<ul style="list-style-type: none"> <input type="checkbox"/> To develop the skill of understanding about natural calamities and disaster and to realize the consequences as well as preparedness. <input type="checkbox"/> To create awareness on human and natural disasters <input type="checkbox"/> To understand classification of disasters and its impacts
20	GEG-306A	Regional Geography of Andhra Pradesh	2018	<ul style="list-style-type: none"> • To acquaint the students with re-organization of Andhra Pradesh and its new physical, climate and drainage aspects.. • To obtain the knowledge of demographic, irrigation and major crops. • To understand Andhra Pradesh mineral and industrial aspects with transportation. • To improve knowledge on the transportation and communication aspects of Andhra Pradesh
21	GEG-306B	Geographical information System(GIS) and Global Positioning System(GPS) applications	2018	<ul style="list-style-type: none"> • To develop the skill of understanding GPS and Survey. • To create awareness on post processing of GPS data and collection of data from GPS survey. • To develop skill of report writing by using GPS data and software and hardware To acquaint knowledge about especially Geographic Information System(GIS) softwares. • To develop the skill of geo-referencing and creation of different data files. • To improve the practical knowledge on attributed data and linkage. • To develop the skill on analysis methods of GIS.
22	GEG-401	Regional Planning	2018	<ul style="list-style-type: none"> <input type="checkbox"/> To apprise the concept of Region and its planning. <input type="checkbox"/> To explain the types of regions and regional hierarchy. <input type="checkbox"/> To explain the types of regional planning and planning process. <input type="checkbox"/> To the people participation in planning process and role of Panchayat Raj system <input type="checkbox"/> To explain the resource based and physiographic based regional planning.

23	GEG-402	Advanced Remote Sensing	2018	<ul style="list-style-type: none"> • To give broad knowledge on photogrammetry, Principle, process, platforms and techniques and Aerial photographs. • To provide knowledge on software and hardware required for digital image processing, image enhancement and restoration techniques. • To understand the application of remote Sensing and Photogrammetry in various fields of study.
24	GEG-403P	Research Techniques	2018	<ul style="list-style-type: none"> • To provide an understanding for the student on statistical concepts to include measurements of location and dispersion, and correlation analysis. • To calculate and apply measures of location and measures of dispersion--grouped and ungrouped data cases. <p>To sensitize the different Research and agricultural techniques</p>
25	GEG-404P	Remote Sensing Applications	2018	<ul style="list-style-type: none"> <input type="checkbox"/> To explain practical knowledge on Remote sensing applications... <input type="checkbox"/> To help to understand Visual and digital interpretation of satellite Images. <input type="checkbox"/> To illustrate interpretation of Aerial photos. <p>To acquaint knowledge on allocation of RS in different fields and sectors</p>
26	GEG-405A	Water and Soil Resource Management	2018	<ul style="list-style-type: none"> • To apprise the student to various water resources related aspects and hydrological cycle. • To focus on groundwater and soils specifications. <p>To develop skill of water and soil management and to study on some case studies</p>
27	GEG-405B	Environmental Studies	2018	<ul style="list-style-type: none"> • To create the environmental aptitude among students. • To familiarize the students with concepts, issues, approaches about physical land • To acquaint with contemporary environmental problems and challenges. <p>To provide knowledge on Ecosystem, Biomes, food chain and hydrological cycle</p>
28	GEG-405C	Geography for Research Extension and	2018	<ul style="list-style-type: none"> <input type="checkbox"/> To explain the historical evolution, of research in Geographical studies. <input type="checkbox"/> To help to understand about ethics, methods and factors in geographical research. <input type="checkbox"/> To provide the knowledge about forms of research and design. <input type="checkbox"/> To illustrate research methods and data collection.

		industry		Toacquaintresearchanalysisandreportwriting
29	GEG-406A	Regional Geography of India	2018	<ul style="list-style-type: none"> • Toconceptualizetheregionalapproachesandtoexamine regionaldifferentiationinthestudyofIndianGeography. • Toexposetohistorical,economic,cultural,socialandphysicalcharacteristicsofIndia. <p>ToprovideanintroductiontotheregionsoftheIndiaintermsofboththeiruniquenessandsimilarities</p>
30	GEG-406B	Remote sensing Principles and Applications	2018	<ul style="list-style-type: none"> <input type="checkbox"/> ToexplainpracticalknowledgeonRemotesensingapplications... <input type="checkbox"/> TohelptounderstandVisualanddigitalinterpretationofsatelliteImages. <input type="checkbox"/> ToillustrateinterpretationofAerialphotos.

36. Geology:

S. No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	GEO-101	Geomorphology and Paleontology	2018	1) Able to explain conceptual approaches in geomorphology. 2) Able to describe land forms and land forming processes in different climatezones and tectonic regimes. 3) Able to explain different theories and models for landscape evolution. 4) Obtain knowledge in recognizing and minimizing the mass wasting. 5) Able to apply geomorphological concepts in economically important projects. 6) <i>Palaeontology</i> is the study of prehistoric species, mostly ones that are extinct. It focuses primarily on fossil data, using a variety of physical, chemical and biological. 7) Paleontology has essentially three basic goals: (1) to describe the world's past biodiversity; (2) to outline the history of life on earth; and (3) to develop new ideas about evolution and ecology.
2	GEO-102	Crystallography & Mineralogy	2018	1) Students will be able to describe crystal structures, crystal symmetry and twinning

				<p>2) Students will learn the use of X-ray crystallography to determine the arrangement Atoms in a crystal.</p> <p>3) Students will be able to identify the mineralogical composition of geological materials by studying some of the optical properties and techniques in order to reveal their origin and evolution.</p> <p>4) Students will get thorough knowledge about the physical chemical and optical Characteristics of minerals could lead to the discovery of new uses for Earth's mineral resources.</p>
3	GEO-103P	Crystallography & Mineralogy	2018	<p>1. The student understands the importance of minerals to society and to the study of the Earth.</p> <p>2. Can explain how the properties of chemical elements and their bonds regulate the structure and composition of minerals.</p> <p>3. Demonstrate how the crystal structure of minerals affects the external morphology and physical properties of a mineral (e.g. crystal symmetry, crystal habit).</p> <p>4. Identify various minerals using Physical properties.</p> <p>5. Identify various crystal forms shown by minerals belonging to different crystal system.</p>
4	GEO-104P	Geomorphology & Paleontology	2018	<p>1) The practical application of geomorphological science now forms river restoration and environmental protection.</p> <p>2) the extensive experience gained through field work, analysis and input to the design process to provide thorough understanding of geomorphology in the river environment and describe</p> <p>3) Paleontology is highly relevant to the modern and future world. We can learn how climate change has effected past organisms as well as how organisms have changed the physical world. We can also better understand the principles of extinction, evolutionary change, and biodiversity.</p> <p>4) Paleontological resources, or fossils, are any evidence of past life preserved in geologic context. They are a tangible connection to life, landscapes, and climates of the past. They show us how life, landscapes, and climate have changed over time and how living things responded to those changes.</p>

				<p>5) Paleontology lies between biology and geology since it focuses on the record of past life, but its main source of evidence is fossils in rocks.</p> <p>6) paleontology, also spelled paleontology, scientific study of life of the geologic past that involves the analysis of plant and animal fossils, including those of microscopic size, preserved in rocks.</p> <p>7) Body fossils and trace fossils are the principal types of evidence about ancient life, and geochemical evidence has helped to decipher the evolution of life.</p>
5	GEO-105	Stratigraphy & Paleontology	2018	<p>1) Students would have acquired comprehensive knowledge on principles of Stratigraphy, correlation methods classification of Stratigraphy units, tectonic framework of India and Geological timescale.</p> <p>2) Ability to give an account of various stratigraphic units and give stratigraphic column distribution in India, fossil content and economic importance of given geological formation.</p> <p>3) Apply standard stratigraphic codes while preparing geological reports</p> <p>4) Describe morphology, classification, evolutionary trends of Invertebrate fossils with geological and geographic distribution and paleoecological and paleo-environmental relevance.</p> <p>5) Ability to identify, classify and describe the morphology of the invertebrate fossils and plant fossils.</p> <p>6) Application of fossils in establishing the age of the rockunit, correlation with other area, and Use of fossil in finding mineral deposits.</p> <p>7) Ability to apply micropalaeotological techniques in hydrocarbon exploration.</p>
6.	GEO-106	Human Values & Professional Ethics-I	2018	<p>1) After completion of this course the students will be able to know the importance of Ethics and Human Values in various professions.</p> <p>2) Students also will get in depth knowledge and understanding of moral values and ethical code of the Indian Society. Especially embedded in various scriptures.</p>
7.	GEO-201	Structural Geology and Geotectonics	2018	<p>1) Able to demonstrate a basic understanding of stress, strain, rheology of earth's lithosphere and comprehend how to describe and classify brittle and ductile structures.</p> <p>2) Able to describe, identify and analyze the folds, faults and joints and their effects on outcrop pattern.</p>

				<p>3) Measure, plot and interpret structural field data and can relate these to geological Maps and knows how to read geological maps and geological cross-section.</p> <p>4) Obtain knowledge of shear zone characteristics and textures which are usually highly, Mineralized zones.</p>
8.	GEO-202	Remote Sensing and GIS	2018	<p>1) Develop knowledge in basics of Remote Sensing interpretation keys and applications.</p> <p>2) Formulate the relationship between EMR and satellite Remote Sensing.</p> <p>3) Application for Remote Sensing for important economic deposits.</p> <p>4) Operate GIS data model and demonstrate GIS techniques for various applications.</p> <p>5) Apply RS and GIS techniques to analyze the various geological materials.</p>
9.	GEO-203P	Structural Geology & Sedimentology	2018	<p>1) The interpretation of geological maps and determination of strike and dip, Borehole problems and apparent dip, plunge and pitch of linear structures</p> <p>2) Structural geology concepts and tools to understand rocks deformation in hot environments</p> <p>3) Structural geology with interpretations and simple geomechanical problems and solutions</p> <p>4) Structural geology issues related to new instruments in measuring structural data from rocks, paleomagnetic studies in tectonics field studies in structural geology interdisciplinary aspects of structural geology.</p> <p>5) Sedimentology encompasses the study of modern sediments such as sand, silt, and clay, and the processes that result in their formation (erosion and weathering), transport, deposition and diagenesis.</p> <p>6) Sedimentology, the study of sedimentary rocks and the processes by which they are formed, includes and is related to a large number of phenomena.</p> <p>7) Sedimentology includes the five fundamental processes defined by the term sedimentation --weathering, erosion, transportation, deposition and diagenesis.</p>
10.	GEO-204P	Remote Sensing and GIS	2018	<p>1. Understand the concepts of Photogrametry and compute the heights of objects</p> <p>2. Understand the principles of aerial and satellite remote sensing, Able to</p>

				<p>comprehend the energy interactions with earth surface features, spectral properties of water bodies.</p> <p>3. Understand the basic concept of GIS and its applications, know different types of data representation in GIS.</p> <p>4. Understand and Develop models for GIS spatial Analysis and will be able to know what the questions that GIS can answer are.</p> <p>5. Apply knowledge of GIS software and able to work with GIS software in various application fields.</p> <p>6. Illustrate spatial and non spatial data features in GIS and understand the map projections and coordinates systems.</p> <p>7. Apply knowledge of GIS and understand the integration of Remote Sensing and GIS.</p>
11	GEO-205	Sedimentology	2018	<p>1) Able to identify different sedimentary rocks in both hand specimens and thin section and derive information on the depositional conditions and environments.</p> <p>2) Able to study the sequence of sedimentary rock strata and describe the tectonic framework of sedimentation to understand the earth's history including palaeoclimatology and history of life</p>
12	GEO-206	Human Values & Professional Ethics-II	2018	<p>1) After completion of this course the students will be able to follow and practice good behaviour with human values and moral support to their elderly family members.</p> <p>2) They also aware and get knowledge about medical ethics how the doctors will behave with patients, what type of ethics should be followed by business people. They also get in through knowledge about the protection of environment social ethics like family ethics, the role of print and electronic media in prevention and protection of Human rights in Indian society.</p>
13	GEO-301	Igneous Petrology	2018	<p>1) Acquire knowledge on the evolution of magma by different processes takes place from origin to emplacement with respect to different tectonic settings.</p> <p>2) Explain Igneous processes, formation, structures, classification and significance of texture in explaining rock history.</p> <p>3) Obtain knowledge on the crystallizing phase equilibrium of multi component magma system.</p>

				4) Identify different Igneous rocks both in handspecimens and thin sections in terms of their petrogenesis by studying the petrographic characteristics.
14	GEO-302	Metamorphic Petrology	2018	<p>1) This course has links directly with industry and share the knowledge about a wide range of ore deposits.</p> <p>2) Offers a detailed study of origin of economic mineral deposits its identification properties and distribution in India.</p> <p>3) Comprehensive knowledge in reflection light optic and ore textures.</p>
15	GEO-303P	Petrology	2018	<p>1) Describe the types and relative abundances of phases in a rock based on observations from hand specimens and thin sections</p> <p>2) Interpret the geologic history of igneous rocks based on mineral assemblage and textures using both hand sample and microscope techniques</p> <p>3) Use metamorphic mineral assemblages and textures to constrain deformation history and P-T conditions</p> <p>4) Use geochemical data (partition coefficients, REE plots, etc) to constrain petrogenetic processes</p> <p>5) Integrate their research findings with those of peers in developing a consensus model that (a) explains mineral occurrences and interplay (micro- and macroscopic) in field samples, and (b) holds up to public scrutiny (as a consensus model and as individual components) at a departmental mini-poster symposium</p> <p>6) Design and implement a field sampling campaign</p> <p>7) Use a portable X-Ray Fluorescence Spectrometer to collect elemental analyses</p> <p>8) Use MS Excel to organize, plot, and evaluate the petrogenesis of CRB using elemental data</p>
16	GEO-304P	Geochemistry	2018	1) Geochemistry can play a key role in helping to protect the safety of drinking water by identifying the sources, concentration and forms of potentially harmful

				<p>elements such as arsenic mercury and fluoride in natural water.</p> <p>2) Geochemistry and health establishes and explains links between the natural or disturbed chemical composition of the earth's surface and the health of plants animals and people.</p>
17	GEO-305	Geochemistry and Thermodynamics	2018	<p>1) Understand the behavior of elements in a geochemical context and relate this knowledge to how elements redistribute within the Earth.</p> <p>2) Learn to interpret and explain interactions between Earth reservoirs.</p> <p>3) Understand and interpret the major processes that form and modify the Earth's crust and mantle.</p> <p>4) Use isotopes to trace geological processes and age date specific events.</p>
18	GEO-306	Computer Applications and Geostatistics	2018	<p>1) Comprehend the database related to field geological data</p> <p>2) Prepare and Interpret graphical and pictorial data</p> <p>3) Exposure to some selected software's related to geology</p>
19	GEO-307	Dimensional Stones and Building Materials	2018	<p>1) Explain the distribution of dimensional stones and occurrence of construction materials</p> <p>2) Classify dimensional stones and construction materials</p> <p>3) Assess the suitability of various dimensional stones and construction materials</p>
20	GEO-308	Gemology	2018	<p>1) The course is focused on a comprehensive learning in gemology</p> <p>2) Understands the formation, classification and properties to final the grading and evaluation.</p> <p>3) Knowledge in order to identify original gemstones and stimulants</p> <p>4) Acquire skills which will be useful to them in gem industry</p>
21	GEO-309	Surveying and Field Geology	2018	<p>1) Understand the use of different surveying instruments, field equipment, aerial photographs and their use.</p> <p>2) Compute the area and earthwork for different works by using surveying instruments</p> <p>3) Analyze surveying techniques, tools, survey data and geological reports</p> <p>4) Prepare contour maps, geological maps and reports</p> <p>5) Solve survey issues using proper survey and interpretation.</p> <p>6) Use appropriate modern tools in surveying and mapping</p>

22	GEO-401	Economic Geology	2018	<p>1) Its chief objective is to guide the exploration for mineral resources and help determine which deposits are economically worthwhile to mine. Specialists in economic geology often assist in the extraction of the mineral commodities as well.</p> <p>2) <i>Economic geology</i> is concerned with earth materials that can be used for economic and/or industrial purposes. These materials include precious and base...</p> <p>3) Scientific <u>discipline</u> concerned with the distribution of mineral deposits, the economic considerations involved in their recovery, and an <u>assessment</u> of the reserves available.</p> <p>4) Economic geology deals with metal ores, fossil fuels (<i>e.g.</i>, <u>petroleum</u>, <u>natural gas</u>, and coal), and other materials of commercial value, such as salt, gypsum, and building stone. It applies the principles and methods of various other fields of the geologic sciences, most notably <u>geophysics</u>, <u>structural geology</u>, and <u>Stratigraphy</u> . Its chief objective is to guide the exploration for mineral resources and help determine which deposits are economically worthwhile to mine. Specialists in economic geology often assist in the extraction of the mineral commodities as well.</p>
23	GEO-402	Mineral Exploration, Mining Engineering & Geology	2018	<p>1) This course linked to industry and acquires knowledge on techniques to locate ore bodies, methods for mineral exploration and geologic aspects of drilling.</p> <p>2) Acquire knowledge on geophysical methods for Ore reserve estimation.</p> <p>3) Acquire knowledge on Ore beneficiation processes and techniques.</p> <p>4) Confirm mining rules and regulations</p> <p>5) Able to determine the suitable mining methods</p> <p>6) Analyse different ores and ore beneficiation processes.</p> <p>7) Understand the different engineering properties of rock types and role of geologists in selecting the sites for different major engineering projects.</p>

24	GEO-403P	Economic Geology	2018	<ol style="list-style-type: none"> 1) This course has links directly with industry and share the knowledge about a wide range of ore deposits. 2) Offers a detailed study of origin of economic mineral deposits its identification properties and distribution in India. 3) Comprehensive knowledge in reflection light optic and ore textures. 4) Acquire practical knowledge on microchemical techniques for identification ores and estimation of ore reserves.
25	GEO-404P	Project Work	2018	<ol style="list-style-type: none"> 1) The geological formation of Kurnool district Devanakonda area are mainly Gulchervu quartzites, closepet granites intrusive dolerite dykes. 2) The soils in the study area are mainly Red soils with patches of black cotton type and some patches of sandy and loamy type of soils are also found. 3) Topographically the Q.L area is a hillock gently slopes towards the west direction. It is low lying plain land with an average altitude of 426m to 453m above the M.S.L. 4) Watershed, a naturally entity in itself combines forest management, land use management and water management.
26	GEO-405	Hydrogeology	2018	<ol style="list-style-type: none"> 1) Apply the knowledge of geological formations and the hydrological properties of rocks 2) Analyze the suitability of water for domestic, irrigation and industrial purposes Conduct geological and geophysical investigations and give recommendations for drilling of borewells. 3) Explain causes of pollution of groundwater give remedial measures to the society. 4) Use modern methods and appropriate techniques to carrying out geophysical studies and artificial recharge methods 5) Students will get critical knowledge on evaluation of geological condition at the major engineering project sites.
27	GEO-	Environmental	2018	<ol style="list-style-type: none"> 1) Explain different aspects of environment and local, regional and global

	406	Geology & Natural Hazards		<p>environmental problems.</p> <p>2) Classify and explain the environmental pollution and disaster control technologies</p> <p>3) Prepare, interpret and implement environment projects</p> <p>4) Identify the natural and environmental disasters, its causes and apply preventive measures.</p> <p>5) Adopt the laws and regulations towards hazard management</p> <p>6) Able to prepare controls of mitigating toward natural disasters.</p>
28	GEO-407	Water Shed Management	2018	<p>1) Explain the importance of watershed management</p> <p>2) Classify and explain the different water harvesting techniques</p> <p>3) Use modern tools for land erosion control</p> <p>4) Develop or improve the people's participatory approach for sustainable development and management of watersheds.</p>
29	GEO-408	Medical Geology	2018	<p>1) Explain about relationship of human Health and Geological Processes.</p> <p>2) Able to understand the importance of the Water quality standards and impact of micronutrient deficiencies in soils and crops on human health</p> <p>3) Analyse the interaction of abundance of elements and geological effects.</p>
30	GEO-409	Fuel Geology	2018	<p>1) The course offers a detailed study about natural fuels like coal and petroleum their formation and distribution especially in sedimentary basins.</p> <p>2) Students shall benefit to have basic ideas about formations, nomenclature in constitution of coal working detail of distribution of coals and coal industry in India, Sufficient idea of formation and entrapment of oil and gas.</p> <p>3) Get elaborate knowledge about occurrence of atomic minerals in nature, methods of prospecting, atomic fuels and environment.</p>

37. Home Science

Food Science Nutrition & Dietetics

S. No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	FSND 101	Food Chemistry and Analysis	2018	<ol style="list-style-type: none">I. Acquire knowledge on chemical composition physical, chemical, and functional properties of Water, carbohydrate, Protein and Fats.II. Understand the principles and working applications of different analytical techniques associated with food.III. Perform skills in qualitative and quantitative estimation of nutrients in different foods.IV. This course gives an hands on experience which will help student to become food analyst at local, regional, national and global levels.
2	FSND 102	Food Science and Experimental	2018	<ol style="list-style-type: none">I. Acquire knowledge on Plant and Animal foods composition, and processing techniques on nutritive quality of foods.II. Understand the principles of cookery of different foods and methods of evaluation.III. This course is prerequisite for skill development in Food Product development.IV. Standardization and experimentation on different foods leading to physical, chemical and sensory changes can be understood leading to become food research analyst in industries at local, regional, national levels.

3	FSND 103	Clinical Nutrition and Dietetics-I Foods	2018	<ul style="list-style-type: none"> I. Understand the concepts of nutrition and its relation to health. II. Describe the role and responsibilities of Dietitian in Hospital. III. Apply Knowledge related to Therapeutic modification of diets and Plan and prepare diet for different diseases conditions. IV. This will help the students to get placements in hospitals and also start their own diet and nutrition clinics.
5	FSND 107	Essential of Food and Community Nutrition	2018	<ul style="list-style-type: none"> I. Understand about nutrients in food, their functions and consequences of deficiency. II. Apply skills for planning diets for nutritional disorders like PEM, Iron, Vitamin A and Iodine. III. Develop the knowledge of techniques to assess the nutritional status of different age groups. IV. Acquire knowledge on government programs to prevent nutritional disorders according to regional and national needs.
6	FSND 104	Food Chemistry and Analysis Practical	2018	<ul style="list-style-type: none"> I. Develop skills in quantitative and qualitative analysis of food.
7	FSND 105	Food Science and Experimental Foods Practical	2018	<ul style="list-style-type: none"> I. Apply skills in standardization of foods using different processing techniques. II. Acquire skills in processing, preparation and evaluation of bakery products.
8	FSND 106	Clinical Nutrition and Dietetics-I Practical	2018	<ul style="list-style-type: none"> I. Acquire hands on experience in Therapeutic modifications of diet for different diseases by planning, preparing and evaluating. II. Acquire community assessment skills in terms of anthropometry, dietary, clinical and biochemical for various disorders and planning programs for important days. III. Apply Computational skills in the Nutritional allowances during life span.
9	FSND 107	Human Values	2018	<ul style="list-style-type: none"> I. Define the term 'ethics' , 'good and bad values', crime and punishment and

		and Professional Ethics-I		<p>religioustolerance.</p> <p>II. Understand the importance of good character, conduct and values embedded in various religions.</p> <p>III. Apply knowledge of professional ethics and correlate the concepts in addressing the ethical issues outside the class room .</p> <p>IV. Demonstrate knowledge of ethical values in non-class room activities, internships and field work and resolve the moral issues. .</p>
10	FSND 201	Nutritional Bio chemistry	2018	<p>I. Understand the metabolism of nutrients such as carbohydrates, proteins, lipids, minerals and vitamins in human physiology.</p> <p>II. Acquire knowledge on factors affecting digestion, absorption of nutrients.</p> <p>III. Create awareness on enzymes and its role in nutrient metabolism.</p> <p>IV. Gain knowledge on role of vitamins and minerals as coenzymes in metabolism.</p>
11	FSND 202	Food Microbiology and Safety	2018	<p>I. Acquire knowledge about important genera of microorganisms associated with food.</p> <p>II. Acquaint with food contaminants and their sources.</p> <p>III. Understand the various factors associated with growth, food spoilage and food-borne diseases of different microorganisms.</p> <p>IV. Gain knowledge on the characteristics of food borne diseases, infections and intoxications and their identification.</p>
12	FSND 203	Clinical Nutrition and Dietetics-II	2018	<p>I. Understand the concepts of dietary principles for various diseases.</p> <p>II. Comprehend knowledge in Dietary modifications for the management of diseases.</p> <p>III. Application of principals in preparation and service of diets to the patients.</p> <p>IV. Able to assess the case studies and construct the diet charts.</p>
13	FSND 204	Nutritional Bio chemistry Practical	2018	<p>I. Develop skill and hands on experience in analysis of biochemical parameters in blood and serum.</p>
14	FSND 205	Food Microbiology and Safety Practical	2018	<p>I. Demonstrate and develop skills in the use of standard methods and procedures for the microbiological analysis of food</p>

15	FSND 206	Clinical Nutrition and Dietetics-II Practical	2018	<ul style="list-style-type: none"> I. Application of principals in preparation and service of diets to the patients. II. Able to assess the case studies and construct the diet charts.
16	FSND 207	Research Methodology	2018	<ul style="list-style-type: none"> I. Understand the concept of doing research about terms like ‘variables’, ‘hypotheses, and ‘research II. Gain knowledge on different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research. III. Critically gain knowledge to select a sample by using different sampling methods like probability and non-probability sampling. IV. Develop a research proposal in the appropriate scientific style. V. Critically apply knowledge of application of statistics in data analysis. VI. Apply skills in using computer applications for data analysis
17	FSND 208	Human Values and Professional Ethics-II	2018	
18	FSND 301	Food Processing and Preservation Technology	2018	<ul style="list-style-type: none"> I. Understand the principles and scope of food processing and preservation. II. Get an overview on various techniques/methods in food processing and preservation. III. Acquire knowledge of emerging technologies and their applications in food processing and preservation. IV. Acquaint knowledge on advanced food preservation technologies.
19	FSND 302	Advances in Human Nutrition	2018	<ul style="list-style-type: none"> I. Appraise the advance concepts of nutrition of Brain, Immunity and Sports. II. Understand the concepts of dietary management in endemic nutrition problems. III. Create knowledge on the dietary management during emergencies. IV. Understand the process and relation of immunity and nutrition
20	FSND 303	Rural work experience	2018	This programme develops competency in the areas of technological, managerial and communication skills among the students. To develop communications skills in

				students using extension training methods through planning, preparing of Teaching Learning materials and providing education in the areas of Nutrition, Child development and transfer of technology.
21	FSND 304	Internship	2018	INTERNSHIP as dietitian in hospitals give practitioner skills for entry-level dietitians who are able to assume leadership roles to improve and maintain the nutritional care of diverse individuals, families and communities within national and global populations.
22	FSND 305-A	Nutrition Research techniques	2018	<ol style="list-style-type: none"> I. Understand the methods of nutritional status assessment. II. Knowledge on assessment techniques of protein quality in diets III. Comprehensive knowledge on research techniques using animal models. IV. Gain knowledge in nutrition research techniques using Human models.
23	FSND 305-B	Geriatric Nutrition	2018	<ol style="list-style-type: none"> I. Understand the physiological changes and theories of ageing. II. Knowledge on importance and consequences of diet in elderly. III. Awareness on degenerative diseases, life style genesis and its management through diet. IV. Describe the government programs and policies for elderly.
24	FSND 305-C	Nutrition in Emergencies And Disaster Management	2018	<ol style="list-style-type: none"> I. Understand and assess the emergency situations related to food and Nutrition in natural and manmade disasters. II. Acquire knowledge on nutrition surveillance and treatment in emergencies. III. Gain Knowledge on planning nutrition relief and rehabilitation in emergencies. IV. Develop skills in Nutritional epidemiological studies.
25	FSND306-A	Fundamentals of Food, Nutrition and Health	2018	<ol style="list-style-type: none"> I. Gain knowledge on foods, food groups, balanced diet for different age groups. II. Understand the importance of macro and micronutrients in daily diet. III. Comprehend knowledge on deficiency symptoms of different nutrients. IV. Develop skills and hands on experience to assess nutritional problems in community.
26	FSND306-B	Nutritional Assessment	2018	<ol style="list-style-type: none"> I. Learn the determinants of Nutritional Surveillance. II. Understand the direct and indirect methods of nutritional assessment. III. Knowledge on dietary assessment at individual and house hold level.

				IV. Identify the clinical symptoms and biochemical tests for different nutritional problems.
27	FSND 401	Food Safety Standards and Quality Control	2018	<ul style="list-style-type: none"> I. Understand the current food safety standards rules and regulations. II. Gain knowledge on desirable and undesirable constituents and contaminants in foods. III. Critical analysis on subjective and objective methods of quality of food. IV. Develop skills for quality analysis and assurance of food.
28	FSND 402	Food Product Development and Marketing	2018	<ul style="list-style-type: none"> I. Illustrate the new product categories in food market and their characteristics. II. Elucidate the process of new food product development in food industry. III. Exemplify various specialty food products and their applications. IV. Acquire the skill to design and development of new food product and analyze the quality of the product.
29	FSND 403	Nutrition for Health and Fitness	2018	<ul style="list-style-type: none"> I. Define the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation. II. Understand the Energy metabolism pathways during physical activity. III. Describe the role of macronutrients in physical performance, weight management and obesity. IV. Explains the nutritional needs in different sports and the role of national agencies.
30	FSND 404	Food Safety Standards and Product Development Practical's	2018	<ul style="list-style-type: none"> I. Develop skills for quality analysis and assurance of food. II. Acquire the skill to design and development of new food product and analyze the quality of the product.
31	FSND 405 A	Institutional Food Service Management	2018	<ul style="list-style-type: none"> I. Understand the different types and management of food services. II. Illustrate the infra structure plans, menus and equipment in food service establishments. III. Know the food safety measures in food service establishments. IV. Knowledge on finance and personnel management.
32	FSND 405 C	Technology of Packaging(T+P)	2018	<ul style="list-style-type: none"> I. Provide knowledge on packaging and packaging materials II. An overview of the scientific and technical aspects of food packaging. III. Enable the students to understand the regulations of packaging and packaging material testing.

				IV. Apply skills of new innovations in food packaging to improve product stability and/or to extend the product shelf-life.
33	FSND 406-A	Child Growth and Development	2018	<p>I. Know the terms growth, development and stages of development across life span</p> <p>II. Understand the characteristics of children at different stages of childhood</p> <p>III. Explain the different developments like physical, cognitive , language and social development during childhood.</p> <p>IV. Apply knowledge to understand normal development and developmental delays during childhood.</p>
34	FSND 406-B	Disaster Management	2018	<p>I. Know about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management.</p> <p>II. To understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters</p> <p>III. Explain the efforts made by the NGOs, Community based organizations and local administration in disaster management.</p> <p>IV. Discriminate disaster responses of Armed forces and Police.</p>

Human Development and Child Welfare

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	HDCW-101	Advanced Study of Child Development	2018	Students acquire the knowledge of holistic development of individuals from conception to adolescent period. The students can disseminate the knowledge to teachers and parents regarding normal and delayed development among children. The students can apply skills when they serve as teachers at local level or as extension officers in national schemes like ICDS.
2.	HDCW-102	Community Nutrition	2018	Students acquire knowledge about food groups, RDA and steps in planning a diet. The skills learnt in planning and calculation of nutritive values help when they work in local hospitals or in National programs like Zero budget natural farming , ICDS etc.

3.	HDCW-103	Trends in Early Childhood Education	2018	Students apply knowledge about appropriate approaches to teach pre- school children. They apply skills in the field of early childhood education, when they are placed as pre - school teachers at local level and as pre- school trainers at national level in Government organizations like ICDS or NGOs like Azim Premji foundation, PRATHAM, Bachpan etc.
4.	HDCW-104	Practical-I Developmental Assessment Practical	2018	Students acquire skills on apply skills of observation of recording of all round development among infant and children below 5 years. They learnt how to assess cognitive ,physical, social &emotional development of children from late childhood to adolescent period, and life skills among adolescents.. The students can apply skills when they as teachers at local level or as extension officers in national schemes like ICDS.
5.	HDCW-105	Practical-II Community Nutrition Practical	2018	Students apply skills related to food groups, RDA and steps in planning a diet. The skills learnt in planning and calculation of nutritive values help when they work in local hospitals or in National programs like Zero budget natural forming , ICDS etc.
6.	HDCW-106	Practical-III Early Childhood Education Practical	2018	Students apply skills in the field of early childhood education, when they are placed as pre- school teachers at local level and as pre- school trainers at national level in Government organizations like ICDS or NGOs like Azim Premji foundation, PRATHAM, Bachpan etc.
7.	HDCW-107	Family Dynamics	2018	Students get knowledge related to issues in family and society and understand laws related to marriage and family . Students utilize this knowledge when they work in national organizations like social welfare board ,and family counseling centers and in non-government organizations catering to the family welfare at local level like PASS ,RASS etc..
8.	HDCW-108	Human Values and Professional Ethics-I	2018	Students understand the importance of good character , conduct and values embedded in various religions . Demonstrate knowledge of ethical values in non-class room activities, internships and field work.
9.	HDCW-201	Quality Standards in ECE Centers	2018	Students get knowledge about planning activities for pre-school children .They understand different ways of teaching stories ,rhymes etc using different audio-visual aids.apply skills in planning a day's activities for pre -school children , prepare Teaching Learning Material (TLM) and participate as student teacher in SVU Laboratory nursery school. The practical experience helps in establishing preschools, as entrepreneurs also to serve in Non Government institutions like Azim Premji Foundation, PRATHAM at national level and in Government sectors as extension officer at National level programs that are providing pre- school education

10.	HDCW -202	Child Study Techniques	2018	Students are capable to use standardized techniques for assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS ,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital.
11.	HDCW -203	Children with Developmental Challenges	2018	Students gain knowledge about the causes for various impairments and principles of assessment of children with disabilities and gifted children. The practical skills of management of special children were to be treated when they are placed as special educators in local schools ,colleges and at national Government organizations like NIMH,NIHH at national level and non government organizations at local level like Nava Jeevan center for Visually Challenged ,RASS,PASS etc.
12.	HDCW-204	Practical-I Participation in ECE Center Practical	2018	Students will be able to apply skills in planning a day's activities for pre -school children , prepare Teaching Learning Material (TLM) and participate as student teacher in SVU Laboratory nursery school. The practical experience helps in establishing preschools, as entrepreneurs also to serve in Non Government institutions like Azim Premji Foundation, PRATHAM at national level and in Government sectors as extension officer at National level programs that are providing pre- school education
13.	HDCW-205	Practical-II Child Study Techniques Practical	2018	Students apply skillsfor assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS ,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital
14.	HDCW-206	Practical-III Children with Developmental Challenges Practical	2018	Students are capable to use standardized techniques for assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS ,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital.
15.	HDCW-207	Research Methodology	2018	Student gain knowledge about types of research ,different methods of sampling and preparation of schedules/questionnaires. The students get skills in preparation of a research proposal. The knowledge helps the students to write articles for journals at national and international levels.

16.	HDCW -208	Human Values of Professional Ethics - II	2018	Understand the importance of value education and ethics in medical ,business ,environmental and social fields. The students apply the knowledge while joining in any profession and will contribute to society as socially responsible citizens.
17.	HDCW -301	Parent Education	2018	The students gain knowledge about different child rearing practices and parenting styles adopted by parents. Gain skills in planning education materials for parents ,conduct parent education programs in schools and community, when they work as a teachers at local schools. It helps to disseminate the knowledge related to impact of parenting styles on child behavior to parents , teachers and significant others in the community.
18.	HDCW-302	Theories and Approaches to Child Guidance	2018	The students describe different theories related to child development and understand the reasons for maladaptive behavior. Apply the knowledge of theories to understand the behavior of individuals and also in counselling , when they join as counselors at local schools and mental health institutions at regional level like VIMHANS ,Vijayawada , at national level like NIMH ,Hyderabad and at local level Child Guidance clinics run by Government hospitals like SVRR hospital.
20.	HDCW-303	Practical -I Rural Work Experience	2018	Students develop an understanding of rural life situations and problems related to nutrition and child development relevant to real field situations through practical training. They gain knowledge and skills to impart education related to health and nutrition to the rural audience. This experience will helpful when they join rural development programs run by government like Health and Nutrition Natural Farming Fellow in Natural Farming Project.
21.	HDCW-304	Practical-II Internship	2018	Students get hands-on experience in real life work settings relevant to the human development like SODHANA, Vijayanagaram, Christian Counselling Centre ,Vellore ,Sudheesha Counselling Centre, Hyderabad, VIMHANS, Vijayawada.
22.	HDCW-305	Generic Elective* a)) Infant Development and Stimulation b Development of Learning Material and Children's	2018	(a)Students gain knowledge of stimulation activities for physical ,language ,cognitive and social development of infants. The knowledge and skills will help to plan stimulation activities for infants ,when they establish crèche as entrepreneurs or serve in Day care centers. (b) Students understand the importance and principles of teaching materials for young children. They gain skills in planning and development of material for al round development of children. The students can prepare teaching, learning materials when they join as teachers in pre - schools at local levels and as resource persons at national organizations like “Ajimpremji” Foundation.

		Literature c) Planning For Project Management		(c) Students gain knowledge in identification of problem for a research project, apply skills in selection of tools ,data collection and report writing .The knowledge helps the students to write articles for national and international levels and also to take up small projects.
24.	HDCW -401	Guidance and Counselling in Human Development	2018	The students gain the knowledge of different approaches to counselling. This will apply counselling skills to practice counselling process. The knowledge helps the students towards employment as counsellors in mental health institutions like VIMHANS ,Vijayawada and local non government organizations like RASS ,PASS ,VIMHANS ,Vijayawada etc.
25.	HDCW -402	Advanced Human Development	2018	Students understand the characteristics and problems of early, middle and late adulthood persons. This knowledge helps when they get employment in Day care (or) foster care centers for elderly citizens (or) employment in Govt and ,local old age homes run by non govt organizations like RASS and PASS etc.
26.	HDCW -403	Rehabilitation and Management of Children with Special Needs	2018	Students understand the importance of Rehabilitation of children with developmental challenges through multi disciplinary approach. Gets practical knowledge about functioning of Govt and voluntary organizations that are managing children with developmental challenges .This helps students when they join as special educators at govt organizations like NIMH, Hyderabad and non govt organizations like RASS,PASS.
27.	HDCW-404	Practical Guidance and Counseling Practical	2018	The students gain the knowledge of different approaches to counselling. This will apply counselling skills to practice counselling process. The knowledge helps the students towards employment as counsellors in mental health institutions like VIMHANS , Vijayawada and local non government organizations like RASS ,PASS ,VIMHANS , Vijayawada etc.
28.	HDCW-405	Generic Elective* (a) Child and Human Rights or (b) Organization and Management of Child Welfare of Institutions	2018	(a) Students gain knowledge about human rights ,child rights and women rights. They can explain issues faced by women and children in difficult circumstances . The knowledge helps to understand the rights and problems of women and children when they work in Government organizations like Child Protection Officers. b).Students gain knowledge about the organizations striving for child welfare at national and international level. The knowledge helps when students join as supervisors in national schemes like ICDS and at regional level organization like RASS and PASS etc.

		(c) Behavior problems and disorders among children		(c)The students recognize the systems of common behavior problem and disorders among children. They apply skill in management of problems and disorders through behavior modification techniques .These skills help the students when they work at local NGO like RASS, PASS and regional level like VIMHANS Vijayawada.
29.	HDCW-406	Open Elective* (For other departments) a) Child Welfare Programs or (b) Disaster management	2018	a). Students gain knowledge about the organizations striving for child welfare at national and international level. The knowledge helps when students join as supervisors in national schemes like ICDS and at regional level organization like RASS and PASS etc. b).Students gain in-depth knowledge about natural disasters; manmade disasters; chemical hazards : disaster management. This helps to understand efforts made by the NGOs, Community based organizations and local administration in disaster management and also to help Government in times of disasters

Extension Management and Communication Technology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	EMCT-101	Extension Education in Community Development	2018	The students can gain understanding on the Extension Management community development and panchayat raj system to study the community by using PRA and various approaches of extension education. The students will get jobs as extension officers, and various placements in community development projects, as well as rural

				co-operative sector.
2	EMCT-102	Community Nutrition	2018	The students know about nutrients in food and know about the nutritional deficiencies and the community level problems and policies and programmes of Nutrition.
3	EMCT-103	Communication and Media Preparation	2018	The concept of Communication –Recent trends in Instructional technology: Extension literature and the role of different factors influencing and effecting communication process- Dyad setting small group and mass communication. This course will help the students to improve their communication skills.
4	EMCT-104	Extension Education in Community Development Practical	2018	The students will acquire skill to study the community by using PRA techniques and develop the skill of critical analysis on various approaches of extension education.
5	EMCT-105	Community Nutrition Practical	2018	Students gain practical knowledge on the role of nutrients in different stages of human life and methods of nutritional assessment and community level problems and policies.
6.	EMCT-106	Communication and Media Preparation Practical	2018	Students analyze the role of different factors influencing and effecting communication process, preparation and use of different teaching aids in teaching different groups of people and in different learning situations.
7.	EMCT-107	Dynamics of Rural Society	2018	The students will gain knowledge on social structure; characteristics of rural people; rural social problems - social institutions, learn the factors affecting social change and gain insight about the welfare policies and programmes for rural society.
8.	EMCT-108	Human Values and Professional Ethics-1	2018	Students will apply knowledge of professional ethics and correlate the concepts in addressing the ethical issues outside the class room.

9.	EMCT-201	Entrepreneurial Development and Empowerment of Women	2018	Students acquire knowledge on Entrepreneurship, about the strategies for empowering women; rights of women and develop the entrepreneurship skills and learn about the institutional support of entrepreneurship. This course will help the students to become good entrepreneurs and also to start their own business enterprise.
10.	EMCT-202	Educational Technology	2018	The students gain knowledge on concept of teaching learning process; forms and levels of teaching and learning; curriculum design, development knowledge on genesis and trends in modern education. This will help the students to develop the curriculum and to choose their career in the teaching field.
11	EMCT-203	Community organization and Leadership	2018	Students will know about community organization, process of Community organization, rural institutions, leadership, analyze different patterns of leadership; techniques of identification of leaders; steps to organize youth clubs; Role of Panchayat in developing rural women.
12	EMCT-204	Entrepreneurial Development and Empowerment of Women Practical	2018	Students will realize the role of entrepreneurship in economic development. Develop the skill of writing the business proposal and starting of business enterprise.
13	EMCT-205	Educational Technology Practical	2018	Students will develop the skill on developing a course curriculum; Preparation of lesson plans of selected topics and use of different instructional materials.
14	EMCT-206	Community Organization and Leadership Practical	2018	Students will develop the skill on different patterns of leadership, techniques of identification of leaders, and appraise the ongoing programmes in the locality.
15	EMCT-207	Research Methodology	2018	Students get knowledge on 'variables', 'hypothesis', research 'and recognize the purpose of doing a research, sampling methods and develop a research proposal in the appropriate scientific style.

16	EMCT-208	Human values and Professional Ethics-II	2018	Students gain knowledge on 'value education' 'self-introspection' and 'self-esteem develop well balanced personality, socially responsible persons of the society.
17	EMCT-301	Rural Development Administration	2018	Students gain insight about administration in Extension and rural development: coordination and supervision in rural development administration, the purpose and principles of administration; human relation in extension administration the recent ongoing rural development programmes etc. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
18	EMCT-302	Training and Development	2018	Students will learn the concept of training, goals of training; learning and types of learning, factors affecting learning among adult, current trends in training methodologies; training strategies and designs and acquire skills in developing; selection and use of different training methods- case study; role play; and brain storming; etc. This course will help the students to get jobs as Trainee- motivators, Trainers, consultants etc.
19	EMCT-303	Rural Work Experience	2018	Students will develop an understanding of rural life situations prevailing in villages with special reference to Home science among the student will know about socioeconomic conditions of people and their problems and several agencies and institutions involved in rural development.
20	EMCT-304	Internship	2018	students will gain first-hand exposure of working with NGOs. This will provide a practice-oriented and 'Hands-on' working experience in the NGOs / Government organizations and to enhance the students learning experience.
21	EMCT-305	(a)Managerial Skills for Extension Professionals	2018	Students will know about the conceptualization of management process and its major functions, managerial skill1; nature and importance for extension professionals. To understand the concept; scope and relevance of media in society; functions and future prospects of media systems

		<p>(b) Communication Technologies in Extension</p> <p>c) Sustainable Livelihood Systems</p>		<p>To understand the concept; scope and Communication technologies, relevance of media in society; functions and future prospects of media systems etc</p> <p>Students will know about the livelihoods of rural/urban people; resources – land, soil; climate; water and forests; processes and relationships among agro-climatic and natural resources, understand the production systems- farming and non-farming activities; their linkage with the livelihoods of rural people, food security; livelihood security, indicators of environmental sustainability.</p>
22	EMCT-306	<p>(a) Fundamentals of Food. Nutrition and Health</p> <p>(or)</p> <p>(b) Nutritional Assessment</p>	2018	<p>Students gain knowledge on foods, food groups, balanced diet for different age groups, understand the importance of macro and micronutrients in daily diet.</p> <p>Students will learn the determinants of nutritional surveillance; understand the direct and indirect methods of nutritional assessment. Gain knowledge on dietary assessment at individual and house hold level. Identify the clinical symptoms and biochemical tests for different nutritional problems.</p>
23	EMCT-401	Principles of Guidance and Counseling	2018	Develop knowledge about the concept; purpose; functions and role of guidance; types of services in a guidance programme , counseling and counseling theories, group guidance and counseling; concept; characteristics; Individual v/s group techniques. This course will help the students to get jobs as counselors and in Government and Non-government organizations, as counselors, consultant research co-coordinators etc
24	EMCT-402	Extension Programme Planning	2018	Students will get knowledge about Programme planning in Extension; Programme Implementation; Programme Evaluation, Documentation, Programme Planning; the

		and Evaluation		Preparation of plan of work ; Purpose, types and tools of Evaluation; Programme planning and implementation, documentation in Programme implementation. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
25	EMCT-403	Thesis/ Community Health Management	2018	Students gain knowledge about the concept of community health and global health; Primary Health Care – definitions; principles; components; comprehensive health care; levels of prevention, major health problems in India, management information systems in health, health needs of special groups – women, infants; and children; health of adolescents; geriatric health needs and problems.
26	EMCT-404	Principles of Guidance and Programme Planning Practical	2018	Assess the guidance programmes and counseling process in school and out of school settings and analyze use of standard test of study habits and attitudes (SSHA) for analyzing the study habits and attitudes.
27	EMCT-405	(a)Extension Management (b) Science & Technology for Rural Women	2018	Students will know about administration and management; process of management and organizational climate, understand the qualities and functions of extension personnel; Problems and issues of extension management in India. Analyze the management skills of extension personnel. Students will learn about the Science and Technology for rural development; Energy saving devices-application of solar energy; bio-gas etc., application of Science and Technology in Home science, safe water supply methods suitable for rural areas; health- hygiene and environmental sanitation. ,agencies involved in research and application of Science and Technology.

		(c) Environmental Management		Students will get the knowledge about the life and the environment; physical -chemical factors in the environment; changes in the environment; eco-system-earth, methods of waste management; women and environment government and non-governmental agencies in promoting better health, factors affecting changes in ecosystem and environment
28	EMCT-406	(a) Child Welfare Programmes or (b) Disaster Management	2018	<p>Students will learn concepts of ‘child’ and ‘child welfare’, enlist children in need of care and difficult circumstances, understand the role of government, child welfare programmes developmental and rehabilitative manner to the disadvantaged people in the society, monitoring and evaluation</p> <p>Students will get an insight about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management., global warming etc)efforts made by the NGOs, & Community based organizations and local administration in disaster management.</p>

Food Technology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	FT-101	Food Chemistry and Analysis	2018	<ul style="list-style-type: none"> - Students will acquire knowledge about physical, chemical, and functional properties of foods. - Learn the fundamental principles and working applications of different analytical techniques associated with food. - Students will be able to explore and perform skills in qualitative and quantitative estimation of nutrients in different foods.
2	FT-102	Food Science and Experimental Foods	2018	<ul style="list-style-type: none"> - Students will acquire knowledge on structure, composition and functional properties of plant and Animal foods. - Understand the principles of cookery of different foods and methods of

				<p>evaluation.</p> <ul style="list-style-type: none"> - Students will be able to apply the scientific method and quantitative techniques in standardisation of foods using different processing techniques.
3	FT-103	Cereal Grains, Legumes and Oilseed Technology	2018	<ul style="list-style-type: none"> - Students will gain knowledge on the structure and composition of cereal grains, pulses and oil seeds. - Understanding of the basic concepts of Post harvest technology, mechanism of equipments and processing of cereals, pulses and oilseeds - Know about various processing, milling process and evaluate Traditional and commercially processed foods with cereals, pulses and oilseeds
4	Practical-I	Food Chemistry and Analysis	2018	<ul style="list-style-type: none"> - The students will know about principles and working applications of different analytical techniques associated with food. - Perform skills in qualitative and quantitative estimation of nutrients in different foods.
5	Practical-II	Food Science and Experimental Foods	2018	<ul style="list-style-type: none"> - Comprehensive knowledge on techniques of analysing, evaluating and application of foods in different processing techniques in foods.
6.	Practical-III	Cereal Grains, Legumes and Oilseed Technology	2018	<ul style="list-style-type: none"> - The students will be able to explore knowledge on various processing techniques of cereals, legumes and oilseeds. - Students acquire knowledge in various food applications and product preparations.
7.	FT-104	Essentials of Food and Community Nutrition	2018	<ul style="list-style-type: none"> - Students gain knowledge about nutrients in food and their functions. - Understand the nutritional problems of the community and consequences of deficiency of taking nutrients. - Apply skills for planning diets and techniques to assess the nutritional status of different age groups
8.	FT-105	Human Values and Professional Ethics - I	2018	<ul style="list-style-type: none"> - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. - Values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. - Introducing different concepts of Bhagavad Gita and its applications in uplifting of values in the present society.

9.	FT-201	Technology of Horticulture produce	2018	<ul style="list-style-type: none"> - Attain an overview on the classification composition and post-harvest handling technologies of fruits and vegetables to reduce postharvest losses and their value addition. - Impart the knowledge of processing, preservation and manufacture of fruits and vegetable based food products of fruits and vegetables. - Expertise in development of various Fruits & vegetables based products and assess the quality of fruit and vegetables and their products.
10.	FT-202	Food Microbiology and Safety	2018	<ul style="list-style-type: none"> - Obtain knowledge about important genera of microorganisms associated with food and food spoilages. - Understand the various factors associated with growth, food spoilage and food-borne diseases of different microorganisms. - Demonstrate the use of standard methods and procedures for the microbiological analysis of food
11	FT-203	Dairy Technology	2018	<ul style="list-style-type: none"> - Impart the knowledge of milk grading , composition and technologies of processing of milk and milk products. - Provide in-depth knowledge in various unit operations and developments in dairy processing. - Demonstrate the manufacturing of various dairy products and exemplify the quality of dairy products.
12	Practical-I	Technology of Horticulture produce	2018	<ul style="list-style-type: none"> - Student will know about various fruit and vegetable processing techniques and attain practical knowledge in production and preparation of products
13	Practical-II	Food Microbiology and Safety	2018	<ul style="list-style-type: none"> - Acquire knowledge on laboratory techniques to identify microorganisms in food. - Demonstrate the various microbial estimations in foods by applying standard techniques.
14	Practical-III	Dairy Technology	2018	<ul style="list-style-type: none"> - Students acquire knowledge of grading, composition, quality evaluation and processing techniques of milk and milk products.
15	FT-204	Research Methodology	2018	<ul style="list-style-type: none"> - Awareness about terms like ‘variables’, ‘hypothesis’, research ‘and recognize the purpose of doing research. - Understand different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research.

				<ul style="list-style-type: none"> - Critically apply knowledge to select a sample by using different sampling methods like probability and non-probability sampling and development of research proposal.
16	FT-205	Human Values and Professional Ethics – II	2018	<ul style="list-style-type: none"> - Student will know the values of ethics in various fields including medical, social and business ethics. - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. - Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
17	FT-301	Food processing and Preservation Technology	2018	<ul style="list-style-type: none"> - Students able to understand the scope, principles and different methods of processing and preservation techniques. - Acquire knowledge of emerging technologies and their applications in food processing and preservation. - Understand the applications and limitations of food processing and preservation technology.
18	FT-302	Live Stock and Sea Food technology	2018	<ul style="list-style-type: none"> - Acquire knowledge of the structure, composition, nutritional quality of various, livestock and seafood. - Gain insight knowledge of slaughtering, carcass processing, processing methods used for processing meat poultry and fish. - Prepare various value-added products of egg, meat, poultry and sea foods.
19	Practical-I	Food Processing and Preservation Technology	2018	<ul style="list-style-type: none"> - Student acquires knowledge of emerging technologies and their applications in various processing techniques and products of various foods by processing and preservation methods.
20	Practical-II	In plant training	2018	<ul style="list-style-type: none"> - Provide hands on experience with regard to different areas in food industries. - Acquaint and gain knowledge related to production, unit operations, quality control and marketing aspects of food industry. - Emphasize the prominence of food plant sanitation, food safety, standards, laws and regulation in food industry.
21	FT -303(a)	a)Unit operations in Food Industry.	2018	<ul style="list-style-type: none"> - Important preliminary operations in food processing industries and understand the principle of Unit operation in food industry. - Impart knowledge on Safety, sanitation and Effluent Treatment in food industry.

				<ul style="list-style-type: none"> - Know the different pre and post processing operations as storage and packaging foods etc.
22	FT -303(b)	b) Spices, Condiments and Plantation Crops	2018	<ul style="list-style-type: none"> - Students acquire knowledge, identification and post-harvest technologies of various spices, condiments and plantation crops. - Illustrate various value added products of spices, condiments and plantation crops. - Perceive Standards, specifications, packaging and Quality control measures of spices, condiments and plantation crops.
23	FT -303(c)	c) Nutrition in Emergencies and Disaster	2018	<ul style="list-style-type: none"> - Explain concepts on Epidemiology and its application in planning programs during emergencies and emergency situations in natural and manmade disasters. - Gain knowledge on nutrition surveillance and treatment in emergencies. - Knowledge on planning nutrition relief and rehabilitation in emergencies.
24	FT -304(a)	(a) Fundamentals of Food, Nutrition and Health	2018	<ul style="list-style-type: none"> - Gain knowledge on foods, food groups, balanced diet and importance of macro and micronutrients for different age groups in daily diet. - Comprehend knowledge on deficiency symptoms of different nutrients. - Apply skills to assess on nutritional problems in community.
25	FT -304(b)	b) Nutritional Assessment	2018	<ul style="list-style-type: none"> - Understand the nutritional problems of the community and consequences of deficiency of taking nutrients. - Apply skills for planning diets and techniques to assess the nutritional status of different age groups.
26	FT-401	Food Safety Standards and Quality Control	2018	<ul style="list-style-type: none"> - Gain knowledge in current rules and regulations of food safety standards and quality assurance. - Understand the insight quality evaluation of different foods by standard methods. - Develop skills for quality analysis and assurance of food quality.
27	FT-402	Food Product Development and Marketing	2018	<ul style="list-style-type: none"> - Elucidate the process of new food product development process to generate ideas, develop concept to test market and in food industry. - Acquire the skill to design and development of new food product and analyse the quality of the product. - Student able to design, demonstrate the skills in food process, organoleptic evaluation and nutritional label of food products as a team work.

28	FT-403	Nutrition for Health and Fitness/Project Work	2018	<ul style="list-style-type: none"> - Understand the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation. - Describe the role of nutrients in physical performance, weight management, obesity and Energy metabolism pathways during physical activity. - Gain knowledge on concepts of physical activity, physical fitness and the importance of nutrients in Sports.
29	Practical-I	Food Safety standards and Product Development	2018	<ul style="list-style-type: none"> - Gain knowledge on subjective and objective evaluation methods of foods with safety and standards. - Exemplify various speciality food products and their applications, acquire the skill to design and development of new food product and analyse the quality of the product.
30	FT-404(a)	(a) Institutional food service management	2018	<ul style="list-style-type: none"> - Gain knowledge on principles of safe food preparation and cooking methods and service management
31	FT-404(b)	(b)Basic Food Engineering	2018	<ul style="list-style-type: none"> - Student understands the basic Principles, overview of processing techniques and methods of food. - Able to describe the types and properties of agro processing equipments like pasteurizer, spray drier and sealing equipments. - Enumerate processing equipments and maintenance of processing equipments
32	FT-404(c)	(c)Food Packaging	2018	<ul style="list-style-type: none"> - Enable the students to understand the regulations of packaging and packaging material testing. - Knowledge of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life. - Able to utilize some of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life.
33	FT- 405(a)	(a) Child Welfare Programmes	2018	<ul style="list-style-type: none"> - Understand the different developments like physical, cognitive, language and social development during childhood. - Apply knowledge to understand normal development and developmental delays during childhood.

34	FT- 405(b)	(b)Disaster Management	2018	<ul style="list-style-type: none"> - Understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters;. - Illustrate the efforts made by the NGOs, Community based organizations and local administration in disaster management.
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37. Mathematics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	MA 101	Algebra	2018	<ol style="list-style-type: none"> 1. Identify the concept of action and conjugation. 2. Analyze the maximal, prime, nilpotent and Nil ideals. 3. Understand U.F.D and Polynomial Rings.
2.	MA 102	Real Analysis	2018	<ol style="list-style-type: none"> 1. Understand the concepts of Riemann Stieltjes integration and Differentiation. 2. Understand Uniform Convergence and continuity. 3. Learn comparison tests at a and infinity.
3.	MA 103	Ordinary Differential Equations	2018	<p>Course outcomes: From this course students will be able to</p> <ol style="list-style-type: none"> 1. Learn boundary value problems, Eigen values and Eigen functions 2. Solve the second order linear questions.
4.	MA 104	Complex Analysis	2018	<ol style="list-style-type: none"> 1. Decide when and where a given function is analytic . 2. Understand the Mobius Transformation. 3. Describe basic properties of complex integration and having the ability to compute such integrals. 4. Understand Power series and expansion of analytic

5.	MA 105	Computer Oriented Numerical Methods	2018	<ol style="list-style-type: none"> 1. Apply numerical methods to obtain approximate solutions to mathematical problems. 2. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and non linear equations, and the solution of differential equations. 3. Solve any numerical problem by using programming. <p>Develop interest in Numerical analysis to use finite precision computer arithmetic</p>
6.	MA 106	Human Values and Professional Ethics-I	2018	<ol style="list-style-type: none"> 1. Develop Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic virtue, Respect for others, Living Peacefully, Caring, Sharing, Honesty, Courage, Cooperation, Commitment, Empathy, Self Confidence character, Spirituality, Case study. 2. Understand human values . 3. Develop character, affection and love towards other human beings. 4. Know the value of Four Noble Truths of Buddhism
7.	MA 201	Galois Theory	2018	<ol style="list-style-type: none"> 1. Apply the knowledge on polynomials solvable by radicals, Extension field. 2. Understand the normal and separable extensions. 3. Study the roots of polynomials specially quintic polynomials which is the cause to develop Galois theory. <p>Solve the problems on cyclotomic polynomials</p>

8.	MA 202	Partial Differential Equations	2018	<p>1. solve Pfaffian differential equations and find orthogonal trajectories of a curve.</p> <p>1. Analyze the origin of first order PDEs and Integral surfaces passing through a given curve</p> <p>2. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method.</p> <p>3. Apply various methods to solve Partial Differential Equations of the Second order.</p> <p>4. Obtain equipotential surfaces using Laplace's</p>
9.	MA 203	Topology	2018	<p>1. Understand to construct topological spaces from metric spaces and using general properties of neighborhoods, open sets, closed sets, basic and sub-basis.</p> <p>2. Understand Topological Spaces, definition & examples.</p> <p>3. Know the concepts connectedness, compactness, and Hausdorff property and their general characteristics.</p> <p>4. Understand the Countability axioms, the separation axioms and normal spaces. And also the classical theorems such as the Uryshon lemma, the Tietze extension theorem.</p>

10.	MA 204	Advanced Complex Analysis	2018	<ol style="list-style-type: none"> 1. To learn Laurent Series-Singular Points. 2. Explain the basic properties of complex integration and compute such integrals. 3. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions. 4. Understand the Infinite product and Partial Fraction Expansions.
11.	MA 205	Measure and Integration	2018	<ol style="list-style-type: none"> 1. Compute Lebesgue measures. 2. Compute Lebesgue integrals of bounded functions over a set of finite measure 3. Solving the Differentiation and Integration of Monotone functions. 4. Understand the L^p Spaces, the MinKowski and Holder inequalities, Convergence and completeness
12.	MA 206	Human Values and Professional Ethics-II	2018	<ol style="list-style-type: none"> 1. Understand the fundamental responsibilities and respect towards women 2. Know the value of education. 3. Question the illegal practices in the medical and business fields. 4. Understand the value of ecological balance and act in such a way which saves it. 5. Analyze the impact of media.

13.	MA 301	Commutative Algebra	2018	<p>To understand the ideals, Modules and operations on them.</p> <p>2.To learn the structures of composition series with ACC and DCC</p> <p>2. To study the theoretical properties of Noetherian rings</p>
14.	MA 302	Functional Analysis	2018	<ol style="list-style-type: none"> 1) Work with different distance metrics and normed spaces,understand continuous linear transformations and the Hahn-Banach Theorem. 2) Comprehend the Open mapping theorem and Closed graph theorem. 3) Construct orthonormal sets and conjugate spaces. 4) Understand the relevance of self-adjoint operators, normal, unitary operators and projections.
15.	MA 303	Classical Mechanics	2018	<ol style="list-style-type: none"> 1) Understand D' Alembert's Principle and simple applications of the Lagrangian Formulation. 2) Derive the Lagrange's Equation from Hamilton's Principle. 3) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems. 4) Distinguish the concept of the Hamilton Equations of Motion and the Principle of Least Action.

16.	MA 304	A) Differential Geometry B) Cryptography C) Linear Algebra D) Discrete Mathematics	2018	<ol style="list-style-type: none"> 1. Define space curves , curvature and torsion of a curve. 2. Parameterize surfaces and isometric correspondence. 3. Understand geodesic curves and conformal mapping. 4. calculate and analyse curvature of surfaces in different settings. <ol style="list-style-type: none"> 1) Understand various Cryptographic Techniques. 2) Apply various public key cryptography techniques. 3) Understand the various Security Applications. 4) Implement system level security applications. 5) Be familiar with secure random bit generator and linear feedback shift register sequences. 6) Know classical ciphers such as Vigenere Cipher and Hill Cipher. 7) Know of RSA, attacks on RSA, Diffie-Hellman key exchange and ElGamal, public key crptosystem. <p>Solve the system of linear equations</p> <ol style="list-style-type: none"> 2 .Understand the concept of vector space, basis, dimension and linear Transformation 3. Explain the direct sum decompositions 4. Understand the Bilinear forms. <ol style="list-style-type: none"> 1. Use standardNormal Forms-Disjunctive-Conjunctive Principal Disjunctive 2. Discuss Inference Theory of the Predicate Calculus
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17.	MA 305	A) Business Mathematics B) Basic Mathematics for social sciences	2018	<ol style="list-style-type: none"> 1. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems. 2. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and business. 3. Explain the concepts and use equations, formulae and mathematical expressions and relationships in a variety of contexts 4. Understand The Binary Octal , Octal, Decimal and Hexadecimal Systems. 5. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 6. Understand the concepts of Limit, continuity & differentiation of functions. 7. Apply Integrals to find areas, length & volume of regions. 8. Apply the numerical Techniques to solve differential equations & Algebraic equations.
18.	MA 401	Number Theory	2018	<p>.</p> <ol style="list-style-type: none"> 1. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 2. Understand the concepts of Limit, continuity & differentiation of functions. 3. Apply Integrals to find areas, length & volume of regions. 4. Apply the numerical Techniques to solve differential equations & Algebraic equations.

19.	MA 402	Banach Algebra	2018	<ol style="list-style-type: none"> 1. Understand different types of Banach Algebras with examples. 2. Know the essence of Gelfand mapping 3. Understand the Application of Commutative C*- algebras. 4. Derive the applications of Banach Algebra in analysis, Fourier series, Boolean Algebras and other significant areas of mathematics.
20.	MA 403	Graph Theory	2018	<ol style="list-style-type: none"> 1. Able to define basic concepts of graphs 2. Utilize the Algorithms to find the shortest path, Optimal tree from a given graph. 3. construct reliable communication network. 4. Understand the concepts of practical problems like Chinese postman problem and
21.	MA 404	A) Mathematical Statistics B) Approximation Theory C) Algebraic Coding Theory D) Operations Research	2018	<ol style="list-style-type: none"> 1. To learn the fundamental concepts of statistics and techniques required for data analysis. 2. Apply the knowledge of Binomial, Poisson, Gamma, chi-square, normal distribution in solving various problems,. 2. To explain stochastic convergence

22.	MA 405	A) Theoretical Computer science B) Biomechanics	2018	<ol style="list-style-type: none"> 1) Know the Basic concepts of Metric spaces And Normed Linear space. 2) Knows existence and uniqueness theorems for the best approximations in various Banach spaces. 3) Knows Bernstein's lethargy theorem and its practical and theoretical implications. 4) Be able to use and analyze the basic methods for polynomial approximations.
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APPLIED MATHEMATICS:

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
23.	AMA101	METHODS OF APPLIED MATHEMATICS	2018	<ol style="list-style-type: none"> 1. Expand a function in a Fourier series and able to know under what conditions such an expansion is valid. 2. Aware of the connection between integral transforms (Fourier and Laplace) and be able to use the latter to solve mathematical problems relevant to the physical sciences. 3. Understand the applications of Sylow theorems. 4. Describe Unique Factorization and Euclidean Domains.
24.	AMA 102	Real Analysis	2018	<ol style="list-style-type: none"> 5. Understand the concepts of Riemann Stieltjes integration and Differentiation. 6. Understand Uniform Convergence and continuity. 7. Learn comparison tests at a and infinity.

25.	AMA 103	Ordinary Differential Equations	2018	<p>Course outcomes: From this course students will be able to</p> <ol style="list-style-type: none"> 5. Learn boundary value problems, Eigen values and Eigen functions 6. Solve the second order linear questions.
26.	AMA 104	Complex Analysis	2018	<ol style="list-style-type: none"> 5. Decide when and where a given function is analytic . 6. Understand the Mobius Transformation. 7. Describe basic properties of complex integration and having the ability to compute such integrals. 8. Understand Power series and expansion of analytic
27.	AMA 105	Computer Oriented Numerical Methods	2018	<ol style="list-style-type: none"> 4. Apply numerical methods to obtain approximate solutions to mathematical problems. 5. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and non linear equations, and the solution of differential equations. 6. Solve any numerical problem by using programming. <p>Develop interest in Numerical analysis to use finite precision computer arithmetic</p>

28.	AMA 106	Human Values and Professional Ethics-I	2018	<ol style="list-style-type: none"> 5. Develop Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic virtue, Respect for others, Living Peacefully, Caring, Sharing, Honesty, Courage, Cooperation, Commitment, Empathy, Self Confidence character, Spirituality, Case study. 6. Understand human values . 7. Develop character, affection and love towards other human beings. 8. Know the value of Four Noble Truths of Buddhism
29.	AMA 202	Partial Differential Equations	2018	<ol style="list-style-type: none"> 1. solve Pfaffian differenrial equations and find orthogonal trajectories of a curve. 1. Analyze the origin of first order PDEs and Integral surfaces passing through a given curve 2. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method. 3. Apply various methods to solve Partial Differential Equations of the Second order. 4. Obtain equipotential surfaces using Laplace's

30.	AMA 203	Topology	2018	<ul style="list-style-type: none"> 5. Understand to construct topological spaces from metric spaces and using general properties of neighborhoods, open sets, closed sets, basic and sub-basis. 6. Understand Topological Spaces, definition & examples. 7. Know the concepts connectedness, compactness, and Hausdorff property and their general characteristics. 8. Understand the Countability axioms, the separation axioms and normal spaces. And also the classical theorems such as the Uryshon lemma, the Tietze extension theorem.
31.	AMA 204	Advanced Complex Analysis	2018	<ul style="list-style-type: none"> 5. To learn Laurent Series-Singular Points. 6. Explain the basic properties of complex integration and compute such integrals. 7. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions. 8. Understand the Infinite product and Partial Fraction Expansions.
32.	AMA 205	Measure and Integration	2018	<ul style="list-style-type: none"> 1. Compute Lebesgue measures. 2. Compute Lebesgue integrals of bounded functions over a set of finite measure 3. Solving the Differentiation and Integration of Monotone functions. 4. Understand the L^p Spaces, the MinKowski and Holder inequalities, Convergence and completeness

33.	AMA 206	Human Values and Professional Ethics-II	2018	<ol style="list-style-type: none"> 6. Understand the fundamental responsibilities and respect towards women 7. Know the value of education. 8. Question the illegal practices in the medical and business fields. 9. Understand the value of ecological balance and act in such a way which saves it. 10. Analyze the impact of media.
34.	AMA301	CONTINUUM MECHANICS	2018	<ol style="list-style-type: none"> 1) Be able to describe motion, deformation and forces in a continuum. 2) Be able to derive equations of motion and conservation laws for a continuum. 3) Understand constitutive models for fluids and viscoelastic solids. 4) Formulate and solve specific technical problems of displacement, strain and stress. 5) Perform experiments with stresses and deformations. 6) Numerically model and analyse the stresses and deformations of simple geometries under an arbitrary load in both solids and liquids.

35.	AMA 302	Functional Analysis	2018	<ul style="list-style-type: none"> 5) Work with different distance metrics and normed spaces, understand continuous linear transformations and the Hahn-Banach Theorem. 6) Comprehend the Open mapping theorem and Closed graph theorem. 7) Construct orthonormal sets and conjugate spaces. 8) Understand the relevance of self-adjoint operators, normal, unitary operators and projections.
36.	AMA 303	Classical Mechanics	2018	<ul style="list-style-type: none"> 5) Understand D' Alembert's Principle and simple applications of the Lagrangian Formulation. 6) Derive the Lagrange's Equation from Hamilton's Principle. 7) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems. 8) Distinguish the concept of the Hamilton Equations of Motion and the Principle of Least Action.

37.	AMA 304	A) Differential Geometry B) Cryptography C) Semi Group Theory D) Discrete Mathematics	2018	<ol style="list-style-type: none"> 1. Define space curves , curvature and torsion of a curve. 2. Parameterize surfaces and isometric correspondence. 3. Understand geodesic curves and conformal mapping. 4. calculate and analyse curvature of surfaces in different settings. <ol style="list-style-type: none"> 8) Understand various Cryptographic Techniques. 9) Apply various public key cryptography techniques. 10) Understand the various Security Applications. 11) Implement system level security applications. 12) Be familiar with secure random bit generator and linear feedback shift register sequences. 13) Know classical ciphers such as Vigenere Cipher and Hill Cipher. 14) Know of RSA, attacks on RSA, Diffie-Hellman key exchange and ElGamal, public key crptosystem. <ol style="list-style-type: none"> 1. Define space curves , curvature and torsion of a curve. 2. Parameterize surfaces and isometric correspondence. 3. Understand geodesic curves and conformal mapping. 4. calculate and analyse curvature of surfaces in different settings. <p>Solve the system of linear equations</p>
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38.	AMA 305	A) Business Mathematics B) Basic Mathematics for social sciences	2018	<ul style="list-style-type: none"> 9. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems. 10. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and business. 11. Explain the concepts and use equations, formulae and mathematical expressions and relationships in a variety of contexts 12. Understand The Binary Octal , Octal, Decimal and Hexadecimal Systems. 13. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 14. Understand the concepts of Limit, continuity & differentiation of functions. 15. Apply Integrals to find areas, length & volume of regions. 16. Apply the numerical Techniques to solve differential equations & Algebraic equations.
39.	AMA 401	Number Theory	2018	<ul style="list-style-type: none"> 5. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 6. Understand the concepts of Limit, continuity & differentiation of functions. 7. Apply Integrals to find areas, length & volume of regions. 8. Apply the numerical Techniques to solve differential equations & Algebraic equations.

40.	AMA402	FLUID DYNAMICS	2018	<ol style="list-style-type: none"> 1) Be familiar with continuum model of fluid flow and classify fluid/flows based on physical properties of a fluid/flow along with Eulerian and Lagrangian descriptions of fluid motion. 2) Derive and solve equation of continuity, equations of motion, vorticity equation, equation of moving boundary surface, pressure equation and equation of impulsive action for a moving inviscid fluid. 3) Understand Boundary layer Equations. 4) Solve Analytic Boundary layer equations .
41.	AMA 403	Graph Theory	2018	<p>Able to define basic concepts of graphs</p> <ol style="list-style-type: none"> 2. Utilize the Algorithms to find the shortest path, Optimal tree from a given graph. 3. construct reliable communication network. 4. Understand the concepts of practical problems like Chinese postman problem and
42.	AMA 404	A) Mathematical Statistics B) Approximation Theory C)Algebraic Coding Theory D)Operations Research	2018	<p>To learn the fundamental concepts of statistics and techniques required for data analysis.</p> <ol style="list-style-type: none"> 2. Apply the knowledge of Binomial, Poisson, Gamma, chi-square, normal distribution in solving various problems,. 2. To explain stochastic convergence

43.	AMA 405	A) Theoretical Computer science B) Biomechanics	2018	<p>5) Know the Basic concepts of Metric spaces And Normed Linear space.</p> <p>6) Knows existence and uniqueness theorems for the best approximations in various Banach spaces.</p> <p>7) Knows Bernstein's lethargy theorem and its practical and theoretical implications.</p> <p>8) Be able to use and analyze the basic methods for polynomial approximations.</p>
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38. Microbiology

Course Code	Title of the Course	Years of Introduction	Course Outcomes
MB-102	Enzymology & Microbial Physiology & Metabolism	2017	Be able to know about the nutrition and microbial growth. Be able to know about photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration. Be able to know in depth about various pathways in protein and nucleotide metabolisms
MB-105	Introductory Microbiology	2018	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
MB-106	Human Values and Professional	2018	Nature of Values- Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice,

	Ethics – I		responsibility and freedom. Good behavior and respect for elders, Character and Conduct.
MB-202	Medical Microbiology	2018	Be able to explain about various infections. Be able to understand the diagnostic methods. Be able to explain the symptoms of bacterial infections. Be able to explain the symptoms of viral, fungal and parasitic diseases.
MB-204P	Practical – II Medical Microbiology	2018	Able performs various immune precipitations tests. Be able to perform various types of ELISA methods. Be able to gain practical knowledge about immunoglobulin's and there separation. Be able to perform widal, VDRL and types. Be able to perform various staining procedures. Be able to identify blood cell types.
MB-205	Basics of Virology	2018	Explaining the biological and physical properties of viruses. Describing the differences between viruses vs. virion. Summarizing the different methods of viral study. Explaining tissue and cell culture. Discussing cloning genes and genomes, DNA sequencing and PCR. Listing analysis of components SDS treatment & electrophoresis for nucleic acids. Classifying plants viruses as: single stranded RNA (SS RNA), double stranded RNA (DS RNA); single stranded DNA (SS DNA) and double stranded DNA (DS DNA). Demonstrating knowledge about the genetic composition of plant viruses. Demonstrating knowledge of different viruses shape (rods, polyhedral and bullets). Describing the structure, replication and diseases caused by viruses in the families, Picornaviridae, Togaviridae, Flaviviridae, Caliciviridae, Astoviridae, Coronaviridae, and Arteriviridae. Explaining the structure, replication and diseases caused by viruses in the families, Rhabdoviridae, Paramyxoviridae, Filoviridae, Orthomyxoviridae, and Bunyaviridae
MB-206	Human Values and Professional Ethics –II	2018	Medical ethics- Views of Charaka, Sushruta and Hippocrates on moral responsibility of medical practitioners. Code of ethics for medical and health care professionals. Euthanasia, Ethical obligation to animals, Ethical issues in relation to health care professionals and patients. Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions. Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.
MB 302	Recombinant	2018	This course teaches rDNA technology techniques and their application in the field of genetic

	DNA technology & Bioinformatics		engineering. They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries. Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering
MB 305	b) food microbiology	2018	Through this course, they also learn about microbiology of milk, fermented dairy products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms.
MB-306	b) Industrial food Microbiology	2018	Students in this course will learn about microbes in food, spoilage of food and preservation techniques of food. Through this course, they also learn about microbiology of milk, fermented dairy products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms. At the end of the course, the student will be able to use the preservation techniques for food and use this experience to be employed as quality control experts
MB 405b	Bioprocess engineering	2018	After completing this course, the student will be able to define a bacterium, a fungus, a virus and archaea, give examples of structurally different microbes, and list microbes by their energy metabolism and carbon sources. The student will be able to evaluate the cultivation, enrichment and growth prevention methods for microbes. The student will be able to explain the roles of microbes in elemental cycles on Earth and, the waste decontamination methods based on microbial activities. He/she will be able to judge how microbes and enzymes could be applied in industry.
MB-406a	Fermentation technology	2018	The course aims to provide fundamental insights to exploit microbes for manufacturing of products which have huge industrial significance. The course blends science and engineering with various biochemical processes to obtain products such as food, chemicals, vaccines, medicine . At the end of the course, the student will have a better appreciation for the role of microbes in industry using technology Able to design procedures, record research methodology and interpret the research
MB-406b	Pharmaceutical Microbiology	2018	This course prepares the students in appreciating the its benefits and applications in biotechnological, pharmaceutical, medical field.

39. INDUSTRIAL MICROBIOLOGY:

Course Code	Title of the Course	Years of	Course Outcomes
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		Introduction	
IMB-102	Enzymology & Microbial Physiology & Metabolism	2018	Be able to know about the nutrition and microbial growth. Be able to know about photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration. Be able to know in depth about various pathways in protein and nucleotide metabolisms
IMB-105	Introductory Microbiology	2018	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
IMB-106	Human Values and Professional Ethics – I	2018	Nature of Values- Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice, responsibility and freedom. Good behavior and respect for elders, Character and Conduct.
IMB-202	Medical Microbiology	2018	Be able to explain about various infections. Be able to understand the diagnostic methods. Be able to explain the symptoms of bacterial infections. Be able to explain the symptoms of viral, fungal and parasitic diseases.
IMB-204P	Practical – II Medical Microbiology	2018	Able performs various immune precipitations tests. Be able to perform various types of ELISA methods. Be able to gain practical knowledge about immunoglobulin's and there separation. Be able to perform widal, VDRL and types. Be able to perform various staining procedures. Be able to identify blood cell types.
IMB-205	Basics of Virology	2018	Explaining the biological and physical properties of viruses. Describing the differences between viruses vs. virion. Summarizing the different methods of viral study. Explaining tissue and cell culture. Discussing cloning genes and genomes, DNA sequencing and PCR. Listing analysis of

			<p>components SDS treatment & electrophoresis for nucleic acids.</p> <p>Classifying plants viruses as: single stranded RNA (SS RNA), double stranded RNA (DS RNA); single stranded DNA (SS DNA) and double stranded DNA (DS DNA). Demonstrating knowledge about the genetic composition of plant viruses. Demonstrating knowledge of different viruses shape (rods, polyhedral and bullets). Describing the structure, replication and diseases caused by viruses in the families, Picornaviridae, Togaviridae, Flaviviridae, Caliciviridae, Astoviridae, Coronaviridae, and Arteriviridae. Explaining the structure, replication and diseases caused by viruses in the families, Rhabdoviridae, Paramyxoviridae, Filoviridae, Orthomyxoviridae, and Bunyaviridae</p>
IMB-206	Human Values and Professional Ethics –II	2018	<p>Medical ethics- Views of Charaka, Sushruta and Hippocrates on moral responsibility of medical practitioners. Code of ethics for medical and health care professionals. Euthanasia, Ethical obligation to animals, Ethical issues in relation to health care professionals and patients.</p> <p>Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions. Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.</p>
IMB 305	b) Bioprocess Engineering and Technology	2018	<p>Give elaborate knowledge on Health care products.</p> <p>Provide in depth knowledge about microbial antibodies and recombinant products.</p> <p>Provide detailed knowledge about organic acids and enzymes.</p> <p>Gives in depth knowledge on oxidative transformation.</p>
IMB-306	a) Industrial Biotechnology	2018	<p>Be able to gain knowledge on strain improvement.</p> <p>Be able understand the whole broth processing.</p> <p>Gain knowledge on production of industrial products</p>
	b) Immuno Technology and Human Health	2018	<p>Immunology and Human Health is designed to advance your understanding of the Immune system and to apply this knowledge to basic immunological research of human diseases. The immune system is composed of numerous cells and molecules that act in concert to maintain health, to overcome infection, prevent tumour growth and repair damaged tissues. The study of the immune system provides us with a fascinating insight into the relationship between animals, and the organisms that infect them (bacteria, viruses, protozoans and fungi). This subject provides a greater understanding of the complexity of the immune system and its responses to stresses such as infection. It demonstrates how modulation, or activation, of the immune system can either help overcome infection or may lead to autoimmune disease. Understanding the immune system gives us the potential to develop therapies to control events such as infection or autoimmune conditions.</p>

			This subject helps students expand their understanding of current concepts in immunology and the potential application of applied immunology in medicine, research and industry.
IMB-404	Field Trip/ Industrial Tour Report / Dissertation	2018	Able to design procedures, record research methodology and interpret the research Able to design procedures, record research methodology and interpret the research
IMB-405	a) Biostatistics & Bioinformatics	2018	Be able to gain knowledge on basic concepts in statistics. Be able to design the experimental and statistical basics of biological assays. Be able to give familiarize with microbial genomes Be able to acquaint themselves with metagenomics Be able to learn basics of protein identification method Be able to gain knowledge on drug discovery
IMB-406	a) Microbes in Human Welfare	2018	Microbes are the major components of biological system on this earth. They are present everywhere, even at sites where no other life could possibly exist. Many microbes are useful to human beings. We use microbes and microbial derived products almost every day like curd and other fermented foods like idli, dosa, bread, etc. Microbes are also used in most of the industries. Alcohol, antibiotics, vinegar, etc are important microbial products. Microbes are very helpful in sewage treatment, biogas production and preparation of biofertilizers as well. So it's clear from this chapter that microbes play a very important role in welfare of human society.
	b) Medical and Diagnostic Microbiology	2018	Describe the aetiologies, epidemiology and basic mechanisms of pathogenesis of infectious diseases. Describe the basic principles of diagnosis, antimicrobial treatment, prevention and control of infectious diseases in the hospital and community. Describe the host immune system and explain the host response to infection Understand and interpret basic laboratory tests for the diagnosis of infectious diseases. Apply the principles of molecular and immunological techniques for the diagnosis of infectious diseases. Analyze and solve case studies involving bacterial and fungal agents

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40. Physics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
	PHY 101	Classical Mechanics and Theory of Relativity	2018	1. Formulate the Lagrangian and Hamiltonian mechanics concepts, solve the related problems 2. Learn the concepts of Poisson brackets, Hamilton-Jacobi equations and action angle variables. 3. Understand the Kepler's laws, Rutherford scattering, Euler's equations and solve the related problems 4. Learn the theory of relativity and its applications.
	PHY 102	Atomic and Molecular Physics	2018	1. Understand the various basic concepts of atomic and molecular physics and know the analysis of different molecular spectra and then get the structural details. 2. Learn the concepts and importance of Zeeman effect, Stark effect and Paschen back effect 3. Understand the importance of rotational, vibrational and electronic spectra 4. Learn the various applications of atomic and molecular spectroscopy in different fields.

	PHY 103	Solid State Physics	2018	<ol style="list-style-type: none"> 1. Understand different bonds in solids, importance of lattice vibrations, their models and elastic properties 2. Explain electronic properties of solids in classical, quantum and the nearly free electron model. 3. Able to classify materials as metals, insulators and semiconductors and sketch the band diagram for each 4. Learn Hall effect and Heyness-Schockley experiment and their uses, properties, theories and applications of superconductors.
	PHY 104	Analog and Digital Electronics	2018	<ol style="list-style-type: none"> 1. Understand the design and working of BJT/FET/ MOSFETs based electronic circuits 2. Observe the effect of negative feedback on amplifier parameters, types of negative feedback topologies. Perceive the effect of positive feedback on working of Op-Amps based Oscillators. 3. Learn and understand the basics of digital electronics, Boolean algebra, and be able to design the simple logic circuits and test/verify the functionality of the logic circuits. 4. Develop the skill to build and troubleshoot analog and digital
	PHY 105	General Physics lab. - I	2018	<ol style="list-style-type: none"> 1. Determining the value of Planck's constant and Seebeck coefficient of a thermocouple, and also measurement and behavior analysis of semiconductor, laser, thermistor and white light dispersion. 2. Structural determination using X-ray diffraction method. 3. Learn the applications of lasers
	PHY 106	Electronics lab. - I	2018	<ol style="list-style-type: none"> 1. Identify relevant information to supplement the Analog Electronic Circuits. 2. Set up testing strategies and select proper instruments to evaluate the performance characteristics of the electronic circuit. 3. Able to learn the applications of operational amplifiers 4. Choose testing and experimental procedures on different types of electronic circuits and analyze their operation at different

	PHY 201	Statistical Mechanics	2018	<ol style="list-style-type: none"> 1. Learn different ensembles and partition functions and their applications to thermal properties of solids 2. Understand the concept of partition functions and its applications 3. Understand the concepts of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac distributions. 4. Disseminate the applications of Maxwell's distribution of velocities and various applications of systems behaving as ideal
	PHY 202	Electromagnetic Theory, Lasers and Modern Optics	2018	<ol style="list-style-type: none"> 1. Understand the laws related to electrostatics and magnetostatics 2. Learn about light propagation in various materials and understood properties of lasers and applications 3. Know holographic concept, use of Fourier transforms in optics 4. Learn the basics and construction of optical fibre and optical
	PHY 203	Mathematical Physics	2018	<ol style="list-style-type: none"> 1. Understand and apply the mathematical skills to solve quantitative problems in physics. 2. Apply Laplace and Fourier transforms in solving different problems of mechanics, electronics etc. 3. Solve different physical problems using numerical techniques 4. Understand complex variables and applications
	PHY 204	Nuclear Physics and Analytical Techniques	2018	<ol style="list-style-type: none"> 1. know the concepts of nuclear reactions and their usefulness in nuclear reactors. 2. Learn the classification of elementary particles and its properties 3. apply the various analytical techniques in getting structural details of unknown compounds 4. understand the various advanced spectroscopic techniques and

	PHY 205	General Physics lab. - II	2018	<ol style="list-style-type: none"> 1. Using lasers ins slit width calculation and refractive index measurement, 2. Understand phenomenon of interference through Young's modulus experiment 3. Intensity variation of light, photo transistor working, absorption and decay of nuclear adiation 4. Analyse the results and able to design the instruments
	PHY 206	Electronics lab. - II	2018	<ol style="list-style-type: none"> 1. Identify relevant information to supplement the Analog Electronic Circuits. 2. Choose testing and experimental procedures on different types of electronic circuits and analyze their operation at different operating conditions. 3. Under the architecture and working of 8085 microprocessor 4. Practice different types of wiring and instruments connections keeping in mind technical, Economical, safety issues.
	PHY 301	Quantum Mechanics – I	2018	<ol style="list-style-type: none"> 1. Solve problems in quantum mechanics using Schrodinger's equation and Dirac representation. 2. Grasp the concepts of different pictures and familiar with the applications 3. Know how the approximation methods applied to atomic, nuclear and solid-state physics. 4. Understand scattering theory, formulate and solve scattering equation- solve problems using this theory
	PHY 302	Physics of semiconductor devices	2018	<ol style="list-style-type: none"> 1. Classify different diodes and its importance in different applications 2. Gain theoretical knowledge on devices formation and able to

	PHY 303	Specialization: A) Applied Spectroscopy-I B) Condensed Matter Physics-I C) Electronics-embedded systems	2018	1.Understand the molecular structure and importance of various molecular transition 2.know the rotational, vibrational and Raman spectroscopy of molecules and their various applications 3.Understand the concepts and instrumentation in different spectroscopic techniques 4.Learn about fluorescence and phosphorescence spectroscopy and their applications. 1. Learn the classification of growth techniques and its importance, able to analyze the defects and its importance in properties of solids, gain knowledge on defects importance in growth of crystals 2. Explain various magnetic phenomena and describe the different types of magnetic ordering based on the exchange interaction, and magnons and their importance 3.Understand different dielectric properties, differentiate between ferroelectric, anti-ferroelectric, piezoelectric and pyroelectric materials. 4.Learn excitons, photoconductivity, types of luminescence, decay mechanisms 1. Acquire knowledge about PIC microcontrollers embedded processors and their applications. 2. Develop programs for data transfer, arithmetic, logical and I/O port operations. 3. Develop program for PIC microcontroller timers, serial port and Interrupts using "C"
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	PHY 304	Elective: A) Photonics- I B) Solar Energy-Thermal Aspects C) Vacuum and Thin Film Technology	2018	<ol style="list-style-type: none"> 1. Understand the fundamental properties of lasers and laser systems 2. Know about the different optoelectronic devices and their behaviour 3. Aware of wide variety of applications of opto-electronic components. 4. Learn different modulations of light <ol style="list-style-type: none"> 1. Understand the fundamentals of solar energy, particularly the thermal energy component. 2. Acquire knowledge on solar radiation measurement techniques and procedures. 3. Demonstrate skills related collector performance analysis through hands on experience 4. Learn the working of different solar thermal energy systems <ol style="list-style-type: none"> 1. Learn production of vacuum and working of various pumps and gauges, design of vacuum system and detection of leak in system.
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	PHY 305	Specialization-Lab.	2018	<ol style="list-style-type: none"> 1. Gain experience with some statistics to analyse data in laboratory. 2. Handle the spectrophotometers and could analyse the data. 3. Understand Zeeman effect practically 1. Identify the compounds based on qualitative analysis 1. Minority charge carrier current in calculation of band gap 2. Analysis of magnetic materials in terms of coercivity and saturation magnetization, 3. Creep importance in materials characteristics analysis 4. Transition temperature determination by finding dielectric constant, calculation of dispersion frequency of mono and diatomic lattices through electrical analog 1. Define the arithmetical and logical assembly language for microcontroller PIC 16F877A 2. Know the downloading procedure on hardware into flash ROM of PIC 16F877A
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	PHY 306	Elective - Lab	2018	<ul style="list-style-type: none"> 1. Demonstrate both the theory and experiments related to propagation and modulation of light 2. Learn the optical fibre working 3. Design the Hologram 4. Propose and design new experiments based on the verification of theory with available optical components 1. Demonstrate the skills related to measurement of direct, diffuse and global solar radiation. 2. Understand the working of a solar cell and its efficiency measurement 3. Verify the influence of different parameters on the solar cell efficiency 4. Design a solar module for a specific output current and voltage ratings. 1. Understand the working of rotary and diffusion pumps 2. Band gap determination of semiconductor thin film 3. Working of solar cell 4. Demonstrate the skill acquired in connection with thin film
	PHY 401	Quantum Mechanics - II	2018	<ul style="list-style-type: none"> 1. Learn distinguishability and indistinguishability of identical particles, construct symmetric and anti symmetric wave functions, students able to solve real problems 2. Grasp the concepts of spin and angular momentum as well as their quantization and addition rules. Demonstrate angular momentum operators associated with spherical and symmetrical systems, able to obtain Clebsch –Gordan coefficients and learn its importance in atomic physics 3. Understand the principles of relativistic quantum mechanics and importance of Klein Gordon equation in solving real problems and know the concept of spin arising naturally from the Dirac equation 4. Learn different fields and its importance and gain knowledge

	PHY 402	Advances in Physics	2018	<ol style="list-style-type: none"> 1. Understand the synthesis of nanomaterials, their application and impact on the environment. 2. Know the details of preparation and characterization of nanomaterials, micro and nanoscale devices. 3. Learn the basics of remote sensing, different payloads, sensors, satellite platforms. 4. Get the concept of image processing & interpretation and digital data transmission and storage.
	PHY 403	Specialization: A) Applied Spectroscopy-II B) Condensed Matter Physics-II C) Electronics-Wireless Communications	2018	<ol style="list-style-type: none"> 1. Have the knowledge on crystal field theory and the effect of weak crystal field on S, P, D and F terms. 2. Understand the importance of rare earth doped materials and able to evaluate various laser parameters. 3. Know the instrumentation techniques used in various spectrophotometers and uses of various detectors. 4. Acquire the knowledge on two photon spectroscopy. <ol style="list-style-type: none"> 1. Learn the relation between stress and strain and gain knowledge on elastic constants and velocity of elastic waves in different directions 2. Gain understanding on classical theory of specific heat and quantum theory of specific heat, able to understand Gruneisen parameter and lattice thermal conductivity 3. Know theories of different bands, Fermi construction and experimental determination of Fermi surface 4. Classify, know properties and applications of amorphous semiconductors, liquid crystals and polymers. <ol style="list-style-type: none"> 1. Understand and visualize the digital and optical modulation techniques. 2. Demonstrate the theoretical concepts in the laboratory. 3. Understand the importance of different communications

	PHY 404	Elective: A) Photonics - II B) Solar Energy- Photovoltaic Aspects C) Properties and Applications of Thin Films	2018	1. Understand the fundamental concepts of solar cells, manufacturing processes and limitations. 2. Acquire knowledge on cell efficiency study techniques and procedures for fault analysis. 3. Demonstrate skills related cell performance and fault analysis through hands on experience 4. Comprehend the applications of solar photovoltaic energy in day-to-day applications 1. Understand the fundamental concepts of solar cells, manufacturing processes and limitations. 2. Acquire knowledge on cell efficiency study techniques and procedures for fault analysis. 3. Demonstrate skills related cell performance and fault analysis through hands on experience 4. Comprehend the applications of solar photovoltaic energy in day-to-day applications 1. Measure and analyze the chemical composition and microstructure of thin films. 2. Understand the electrical transport mechanism and optical behavior of thin films. 3. Able to understand the optical properties of thinfilms 4. Learn the various general and technical applications of thin
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	PHY 405	Specialization-Lab. – II / Project Work	2018	<ol style="list-style-type: none"> 1. Use standardized material to determine an unknown concentration. 2. Handle the spectrophotometers and could analyse the data. 3. Learn the applications of ESR 4. Acquire basic knowledge in the field of research. <ol style="list-style-type: none"> 1. Magnetic susceptibility determination, liquid crystal phases with temperature, 2. Working of temperature sensor, heat capacity calculation 3. Resistance variation and measurement in semiconductor with temperature 4. Able to analyze the materials and its behavior
	PHY 406	Elective – Lab. - II / Project Work	2018	<ol style="list-style-type: none"> 1. Understand and visualize the digital and optical modulation techniques. 2. Demonstrate the theoretical concepts in the laboratory. 3. Gain hands on experience and will be able to envisage the concepts more clearly. <ol style="list-style-type: none"> 1. Get the experience on literature collection 2. Get the experience on selection of a problem independently related to recent work 3. Able to plan and execute the problem 4. Develop skills related to presentation of data, analysis discussion of the results and draw conclusions.

41. Psychology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	PSY 101	General Psychology-I	2018	<ul style="list-style-type: none"> • To understand the concepts and scope of psychology • To comprehend the biological basis of behavior • To study the perception and learning theories
2	PSY 102	Social Psychology	2018	<ul style="list-style-type: none"> • To understand the concepts of social psychology • To comprehend the social perception and cognition.

				<ul style="list-style-type: none"> • To study the socialization and attitudes
3	PSY 103	Psychopathology-I	2018	<ul style="list-style-type: none"> • To understand the abnormal behavior and historical and current trends • To comprehend the models of abnormal behaviour and approaches to therapies
4.	PSY 104	Psychological Measurements-I	2018	<ul style="list-style-type: none"> • To understand the psychological measurements • To comprehend the development of psychological tests and principles of test construction.
5	PSY 105P	Practical-I&II	2018	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
6.	PSY-106	Human Values and Professional Ethics-I	2018	
7.	PSY 201	General Psychology-II	2018	<ul style="list-style-type: none"> • To understand fundamentals of motivation and emotion • To understand basic concepts of memory and forgetting • To comprehend the thinking, intelligence and personality of individuals
8.	PSY 202	Applied Social Psychology	2018	<ul style="list-style-type: none"> • To understand the Social Influence, Social Exchange Process in social behaviour. • To comprehend the Prejudice and Discrimination and group and individuals.
9.	PSY 203	Psychopathology-II	2018	<ul style="list-style-type: none"> • To understand anxiety and mood disorders and somatic disorders. • To study Psychosis and Cognitive Disorders across life span
10.	PSY 204a	Psychological Measurements & Statistics	2018	<ul style="list-style-type: none"> • To understand the psychological measurements • To comprehend the development of psychological tests and principles of test construction.
	PSY 204b	Research Methodology	2018	<ul style="list-style-type: none"> • To get knowledge of psychological tests and their use

				<p>in diagnosis.</p> <ul style="list-style-type: none"> • To make students able to diagnose patients with the help of projective tests. • To get understanding of different diagnostic systems. • Learn how to take case history of patients. • To be able to make differential diagnosis.
	PSY 204c	Computer Applications in Psychological Research	2018	<ul style="list-style-type: none"> • To understand the basic components of computer and working in Ms Office, power point and internet services. • To comprehend the application of computer knowledge through creating emails, scientific journals and data scoring
11	PSY 205P	Practical - I & II	2018	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
12	PSY 206	Human values and Professional Ethics-II	2018	
13	PSY 301	Lifespan Developmental Psychology - Infancy to Adolescence	2018	<ul style="list-style-type: none"> • To understand the scope of life span development of infancy and babyhood • To comprehend the Early and Late Childhood and Adolescence.
14.	PSY 302	Personality	2018	<ul style="list-style-type: none"> • To introduce nature of personality. • To help determinants and development. To understand the Assessment of personality
15	PSY 303	Counseling Psychology-I	2018	<ul style="list-style-type: none"> • To understand the meaning of counseling and ethics in counseling • To comprehend the process of counseling and techniques
16	PSY 304a	School Psychology	2018	<ul style="list-style-type: none"> • To introduce nature of school psychology • To help children with emotional, social, and academic issues.

				<ul style="list-style-type: none"> • To collaborate with parents, teachers, and students to promote a healthy learning environment.
	PSY 304b	Organizational Behaviour and HRM	2018	<ul style="list-style-type: none"> • To understand organization and the Individual differences • To comprehend the motivation and leadership To study the decision making and organizational effectiveness.
	PSY 304c	Health Psychology	2018	<ul style="list-style-type: none"> • To understand the need of Health psychology and various models related to health and illness. To comprehend the health behaviour enhancement and management
	PSY 304d	Psychology of Disability	2018	<ul style="list-style-type: none"> • To understand historical development – Models of disabilities in the past and present scenario To comprehend Learning and behavioral disability, Needs and concerns of disabled in all groups
17	PSY 305P	Practical - I & II	2018	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
18	PSY 306	Personality Development (OE)	2018	<ul style="list-style-type: none"> • To study thebiological, psychological and socio cultural determinants &Soft Skills • To help determinants and development. • To understand the Assessment of personality
19	PSY 401	Lifespan Developmental Psychology – Adulthood and Later Maturity	2018	<ul style="list-style-type: none"> • To understand the scope of life span development of Adulthood and Later Maturity. • To comprehend the Adulthood and Later Maturity.
20	PSY 402	Theories of Personality	2018	<ul style="list-style-type: none"> • To introduce nature of personality. • To help determinants and development. • To understand the Assessment of personality
21	PSY 403	Counseling Psychology - II	2018	<ul style="list-style-type: none"> • To understand the meaning of counseling and ethics in counseling • To comprehend the process of counseling and

				techniques
22	PSY 404a	Psychology of Aging – Applied Aspects	2018	<ul style="list-style-type: none"> To study and understand the aging from maturity to old age. A form of discrimination against older adults based on their age. To notice gerontology and issues
	PSY 404b	Consumer Behaviour and Marketing	2018	<ul style="list-style-type: none"> To understand concept of consumer behaviour and market research To comprehend the economic, social and psychological theory of buying motives. To study the effect of advertising, sales promotion, branding and packaging
	PSY 404c	Rehabilitation Psychology	2018	<ul style="list-style-type: none"> To understand historical development – Models of disabilities in the past and present scenario To comprehend Learning and behavioral disability, Needs and concerns of disabled in all groups
23	PSY 405P	Practical I & II	2018	<ul style="list-style-type: none"> To understand the knowledge about psychological assessment To analyze the observed and the collected data to prove the theoretical
24	PSY 406	Life Skills (OE)	2018	<ul style="list-style-type: none"> To learn the concept of life skills and its importance in relation to personality development of an individual. To become aware of the components of life skills and the method of imparting knowledge of life skills.

COUNSELLING PSYCHOLOGY:

S.No	Course Code	Name of the Course	Year off introduction	Course Outcomes

1.	PSY 101	General Psychology-I	2018	<ol style="list-style-type: none"> 1. Understood the concepts and scope of psychology 2. Comprehended the biological basis of behavior 3. Studied the perception and sensation 4. Understood the concepts and learning theories
2.	PSY 102	Social Psychology	2018	<ol style="list-style-type: none"> 1. Understood the concepts of social psychology 2. Comprehended the social perception and cognition. 3. Studied the Socialization 4. Understood the meaning and theories attitudes
3.	PSY 103	Psychopathology-I	2018	<ol style="list-style-type: none"> 1. Understood the meaning abnormal behavior and historical and current trends 2. Comprehended the models of abnormal behaviour and approaches to therapies 3. Learned about classification and assessment of abnormal behaviour 4. Able to evaluate different approaches to therapies for abnormal behaviour
4.	PSY 104	Psychological Measurements-I	2018	<ol style="list-style-type: none"> 1. Understood the assessment and psychological measurements 2. Comprehended the development of psychological tests and principles of test construction. 3. Learned the Principles of Test Construction 4. Understood the test Development and test Standardization Procedures
5.	PSY 201	General Psychology-II	2018	<ol style="list-style-type: none"> 1. The students understood the fundamentals of motivation and emotion 2. They understood the basic concepts of memory and forgetting 3. Comprehended the thinking and intelligence

6.	PSY 202	Applied Social Psychology	2018	<ol style="list-style-type: none"> 1. Students understood about Social Influence 2. Acquainted with social exchange process in social behaviour. 3. Comprehended the prejudice and discrimination 4. To understand what is psychological groups and individuals.
7.	PSY 203	Psychopathology-II	2018	<ol style="list-style-type: none"> a. Understood anxiety and mood disorders b. Acquainted with somatic disorders. c. Studied Psychosis and Cognitive Disorders d. Understood Psychological Disorders Across the Life Span

8.	PSY 204	a. Psychological Measurements & Statistics b. Research Methodology c. Computer Applications in Psychological Research	2018	<ol style="list-style-type: none"> 1. The students acquainted with intelligence and achievement tests 2. The students learned the measurement of personality tests 3. They are clear in understanding the Statistics for Psychological Measurement 4. They have knowledge on Distribution of Scores on Variables <ol style="list-style-type: none"> 1. Understood basic research and applied research including experimental research. <ol style="list-style-type: none"> 1. The students comprehended the problem & hypothesis 2. Gained knowledge on Sampling & Data Collection 3. Understood the application of research designs 1. Understood the basic components of computer 2. Acquainted with Ms Office, power point and internet services. 3. Comprehended the application of computer knowledge through creating emails, scientific journals and data scoring 4. Able to understand Statistical Packages and its application
9.	CPSY 301	Counselling Process	2018	<ol style="list-style-type: none"> 1. Understood the counseling as helping profession 2. To acquire the relation with other helping professions 3. To know the legal and ethical issues 4. Developed the importance of verbal and non verbal

10	CPSY 302	Counselling Skills	2018	<ol style="list-style-type: none"> 1. Understood the micro-skills of counseling through a series of practices. 2. Got an idea about who to understand the people and interpret their feelings with positive appreciation 3. To provide a space where participants can grow, in the sense of allowing an encounter with them first and based on this encounter to achieve a better understanding of how they impact on other people. 4. The ability to examine and assess the clients with scientific manner.
11	CPSY 303	Therapeutic Approaches in Counselling –I	2018	<ol style="list-style-type: none"> 1. Understood the various Therapeutic Approaches of counseling. 2. Understood the techniques relevant to therapies. 3. To acquires the basic procedures. 4. Learned how to touch in the insight of the client
12	CPSY 304A	a. Foundations of Personality	2018	<ol style="list-style-type: none"> 1. Understood nature of personality. 2. Realized the determinants of personality 3. Found that the development of Personality. 4. Understood the Assessment of personality
13	CPSY 304B	b. Lifespan Developmental Psychology – Infancy to Adolescence	2018	<ol style="list-style-type: none"> 1. Exposed the students to the basics of human development 2. Helped the student understand the stages of development 3. Understood the biological, social and emotional development 4. Able to evaluated the behavior of the individual at various stages.

14	CPSY 304C	c. Psychology of Disability	2018	<ol style="list-style-type: none"> 1. Understood the historical development and models of disabilities 2. Acquire the knowledge of assessment of disability. 3. Expertised on handling the disabled Behavior 4. Collected the knowledge about various service organizations
15	CPSY 305	Practical I & II	2018	<ol style="list-style-type: none"> 1. Studied biological, psychological determinants 2. The students aware of socio cultural determinants & Soft Skills 3. The students acquainted with soft skills 4. They learned more on Soft skills
16	CPSY 401	Applications of Counselling in Special Areas	2018	<ol style="list-style-type: none"> 1. Understood how to handle the client with various problems and hailing into different age groups. 2. Learned how to handle the clients with specific problems 3. To attained what is career, personal, vocational and other applied areas of counseling 4. Gained how to organize Counseling programs to handle special concerns in Different social settings.
17	CPSY 402	Therapeutic Approaches in Counselling –II	2018	<ol style="list-style-type: none"> 1. Understood the therapeutic approaches of counseling 2. Improve the major skills in therapeutic techniques 3. Gained specific methods involved in therapy 4. Adopted the different psycho therapeutic models of counseling.

18	CPSY 403	Family Counselling	2018	<ol style="list-style-type: none"> 1. Understand the need and importance of family counseling. 2. Improved how to handle the family issues 3. To maximized use of tools in counseling 4. Learned the specific skills to handle family issues.
19	CPSY 404A	a. Theories of Personality	2018	<ol style="list-style-type: none"> 1. Understood the Psychoanalytic Approach 2. Learned on behavioural approaches to personality. 3. The students comprehended the Humanistic approach 4. The students acquainted with the eastern theories of personality
20	CPSY 404B	b. Lifespan Developmental Psychology – Adulthood and Later Maturity	2018	<ol style="list-style-type: none"> 1. Understood about adult hood 2. Aware of infancy late adult hood problems 3. Identified the early and late old age issues. 4. Acquired the developmental tasks at all ages.
21	CPSY 404C	c. Rehabilitation Psychology	2018	<ol style="list-style-type: none"> 1. The students understood historical development – Models of disabilities in the past and present scenario 2. The students comprehended Assessment of Disability, Psychological Aspects 3. The students are aware of Behavioral Management 4. They acquainted with Organizational services
22	CPSY 405	Practical I & II	2018	<ol style="list-style-type: none"> 1. Learned the concept of life skills and its importance in relation to personality development of an individual. 2. They became aware of the components of life skills and the method of imparting knowledge of life skills. 3. The students have learned more on Life Skills in Specific 4. They acquainted with Self management skills

40. Statistics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	ST - 101	Linear Algebra	2018	<ol style="list-style-type: none"> 1. Students understood for estimation of elementary transformations in matrix and their solutions. 2. Students learnt about characteristic roots and vectors with numerical examples. They also know theoretical proofs of theorems. 3. Discriminate between diagonalizable and non-diagonalizable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms 4. Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in
	ST - 102	Probability Theory	2018	<ol style="list-style-type: none"> 1. Students must have knowledge about random variables, expectations, sets and their properties and inequalities where ever necessary. 2. Students also know the weak law, strong law and central limit theorem and their importance. 3. Students get the knowledge of the Central limit theorem and their real life uses. <p>Students can get the knowledge of the inequalities of probability and their uses.</p>

	ST - 103	Distribution Theory	2018	<ol style="list-style-type: none"> 1. Students know about different continuous and discrete distributions and their properties. 2. They have awareness about central and non-central sampling distributions and order Statistics. Idea about simple, partial and multiple correlation coefficients. 3. Students get the knowledge of the statistical Tests and their real life uses and applications. 4. Students get the knowledge of Regression and Correlations and their real-life applications
	ST - 104	Practical-I (75 Practical + 25 Record)	2018	<ol style="list-style-type: none"> 1. Numerical problems related to, Linear Algebra and Sampling Techniques are solved by executing programs of computers. 2. Linear algebra concepts when working with data preparation, such as one hot encoding and dimensionality reduction. 3. Applying linear algebra problems in real life situations.
	ST - 105	Statistical Computing	2018	<ol style="list-style-type: none"> 1. Students get the basic Programming Skills of C and C++. 2. Students learnt how the Data entre in the Excel with Headings. 3. Students get the knowledge of creating data ase using the MS-Access. <p>Students get the knowledge how to create the reports using MS-EXCEL and MS ACCESS.</p>

	ST - 106	Human Values and Professional Ethics-I	2018	<ol style="list-style-type: none"> 1. Students get the knowledge of the Ethical values. 2. Students get the idea about the Value education. 3. Students learn how to behave in Society. 4. Students get the knowledge of the Bhagavat Geetha and Can apply in their life's.
	ST - 201	Statistical Inference	2018	<ol style="list-style-type: none"> 1. Students know about point estimation, non-parametric models, Game theory, theorems and Proofs where ever necessary. 2. They can understand the concept of random sample from a distribution,sampling distribution of statistic,standard error of important estimates such as mean and proportions. 3. Students may gain the knowledge of testing of hypotheses (both large sample test and small sample test). <p>They can also calculate the problems related to point estimation and interval estimation.</p>
	ST - 202	Multivariate Analysis	2018	<ol style="list-style-type: none"> 1. Students learnt about importance of multivariate variables and their distributions 2. T^2, D^2, MANOVA models are understood and know it's importance. 3. Implement dimension reduction techniques using software on real life problems. <p>Classification analysis methods explained according to their classification algorithm.</p>

	ST-203 A & B & C	<p>(a) Linear Models and Applied Regression Analysis</p> <p>(b) Stochastic Processes</p> <p>(c) Mathematical Analysis</p>	2018	<p>A. Linear Models and Applied Regression Analysis</p> <ol style="list-style-type: none"> 1. Students learnt about different linear and non-linear regression models and their appropriate computational procedures. 2. They know R^2, adjusted R^2 and C_p criteria for model selection. 3. They will get the knowledge of building and fitting linear regression models with software. <p>They also learn about the theory underlying point estimation, hypothesis and confidence intervals for linear regression models.</p> <p>(b) Stochastic Processes</p> <ol style="list-style-type: none"> 1. Students understood stochastic processes, Markov chains, Poisson process, Renewal theory, Branching process, etc. 2. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. 3. Understand the consequences of the Intermediate value theorem for continuous function. 4. Know the chain rule and use it to find derivatives of composite functions and obtain expression for higher order derivatives of a function using the rule of differentiation. Solve integrals and evaluation of multiple integrals with numerical problems. <p>(c) Mathematical Analysis</p> <ol style="list-style-type: none"> 1. Students get the knowledge of real no.'s and set theory and their theories. 2. Students easily earn the knowledge of the sequencing theory.
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	ST - 204	Practical-II (75 Practical + 15 Viva- voce + 10 Record)	2018	<ol style="list-style-type: none"> 1. Students know about the solving of Numerical problems related to Multivariate data. 2. Students can learn how the Statistical tests uses in their real life's by doing the tests on the Real times Data. 3. They can also use the statistical tools and techniques for analyzing the statistical data. <p>Students can solve the agriculture related problems using the Regression Methods.</p>
	ST - 205	Sampling Techniques	2018	<ol style="list-style-type: none"> 1. Students learnt different sampling techniques of with replacement/ without replacement and Different sampling models. 2. Students studied non-Sampling errors and different remedies. 3. Implement Cluster sampling, Ratio and Regression estimation in real life problems 4. Apply unequal probability sampling designs viz. PPSWR, PPSWOR including Lahiri's method and
	ST - 206	Human Values and Professional Ethics-II	2018	<ol style="list-style-type: none"> 1. Students get the Knowledge of Status of Women in the family and society. 2. Students get the idea of the Medical Rights and Their responsibilities in the medical practitioners. 3. Students get the idea about the environmental Ethics. 4. Students Get the knowledge of Human Rights

	ST - 301	Econometric Methods	2018	<ol style="list-style-type: none"> 1. Students learnt heteroscedasticity, multicollinearity and autocorrelation and their estimation procedures. 2. Students understood about different lag models and simultaneous linear equations model with their estimation methods. 3. Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model. 4. Understand the assumptions upon which different econometric methods are based and their implications.
	ST - 302	Design and Analysis of Experiments	2018	<ol style="list-style-type: none"> 1. Students learnt ANOVA, ANCOVA technique for one way and two-way classifications. Multiple comparisons tests using Tukey's, Duncans, Sheffe's and Dunnet's tests. 2. Students understood about Latin squares and their construction, missing plot technique etc. 3. Students explained about Incomplete Block Designs and their analysis, etc. 4. Understand the basic terms used in design of experiments by using appropriate experimental methods
	ST -303	Operations Research-I	2018	<ol style="list-style-type: none"> 1. Students understood about Dual primal, Revised simplex methods. 2. Students learnt non-linear programming, integer programming, CPM, PERT, different models of games. 3. Students can think the real-life problems in the way of Linear Programming Problems and try to solve the problems in Mathematical Way. 4. Students can take a decision in real life by Using the Game Theory Techniques

ST -304	Practical-III (75 Practical + 25 Record)	2018	<p>Students can understand the Statical Methos in Economical Views.</p> <p>Students solved the Numerical problems related to operations research.</p> <p>Students Understand the Life Tables in Demography.</p> <p>Students can understand how the statistics use in biological spectes.</p>
ST-305A	(a)Bio-Statistics	2018	<ol style="list-style-type: none"> 1. Students learnt about biological assay, their distribution and theorems, dose response relationships, basic concepts of biological assay, estimation methods of gene frequencies, etc. 2. Describe single and multi-species population growth models. 3. Apply the concept of deterministic and stochastic models on simple and general epidemics.
ST - 306	(a) Statistics for Biological and Earth Sciences	2018	<p>a) Statistics for Biological and Earth Sciences</p> <ol style="list-style-type: none"> 1. Students learnt about Graphs, measures of averages, measures of dispersion etc. 2. Students understood about Basic probability and important distributions with workout examples. 3. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests with examples. 4. Students used Advanced statistics tools with working illustrations.

	ST - 401	Time Series Analysis and Forecasting Methods	2018	<ol style="list-style-type: none"> 1. Students understood Time series analysis with some important growth models and their fitting 2. Students forecasting using regression, non-linear regression techniques, single, double, triple and adoptive exponential smoothing models. 3. Students obtained knowledge on AR, MA, ARMA, ARIMA, models fitting, diagnostic checking, etc. 4. Check and validate models with its residual analysis and diagnostic checking.
	ST - 402	Demography and Official Statistics	2018	<ol style="list-style-type: none"> 1. Students know the growth rates, life tables, GRR, NRR and growth models. 2. Students understood about gene frequencies, genotypes, phenotypes etc. 3. Students learnt about population census methods, organizations in India and their functions. 4. Useful to students as a means of analyzing and predicting social, cultural, and economic trends related to population.

	ST - 403	Operations Research-II	2018	<ol style="list-style-type: none"> 1. To perform Dynamic programming and their applications and computation procedure with illustration. 2. To discuss different Queuing models steady state solutions with examples. 3. To explain Inventory models with and without shortages, S-splicy, EOQ estimation with simple examples. <p>To understand Replacement problems such as block and age replacement problems, individual and group replacement policies with examples.</p>
	ST - 404	Practical-IV (75 Practical + 15 Viva-voce + 10 Record)	2018	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. 4. Students can understand how the statistics use in biological aspects.

	ST-405 A	(a) Statistical Process and Quality Control	2018	<ol style="list-style-type: none"> 1. Students understood the basic concepts of control charts for variables and their indices. 2. Students performed different control charts like Shewart's moving average, multivariate etc. with their applications. 3. Students used different sequential sampling plans and six sigma tool etc. in solving the problems. 4. Students have awareness about Total Quality Management.
	ST-405 B	Statistics for research, industry and Communitydevelopment	2018	<ol style="list-style-type: none"> 1. Students have done Simulation models, response surface models, demand analysis, social survey and their related measures. 2. Students can understand the basic of research blooms taxonomy of learning levels. 3. Find the topic from current research in statistics education. 4. Students can apply the tools in design, research and

	ST-405 C	Advanced Econometric Models	2018	<ol style="list-style-type: none"> 1. Students understood GLM, SURE, nested and non-nested statistical models. 2. Students learnt about specification error, adding, switching models. 3. Students performed probit, logit models and their estimation. <p>Students can understand the qualitative and limited dependent variable models.</p>
	ST - 406 A	Business Analytics	2018	<ol style="list-style-type: none"> 1. Students learnt Graphs, measures of averages, measures of dispersion etc. 2. Students studied basic probability and important distributions with workout examples. 3. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests and discussed with examples. 4. Students performed advanced statistics tools for solving the problems.

	ST-406 B	(b) Survival Analysis	2018	<ol style="list-style-type: none"> 1. Students learnt about survival functions, their estimating methods, Distributions and their comparison for survival distributions. 2. Understand the elements of reliability, hazard function and its applications. 3. Understand the concept of censoring, life distributions and ageing classes. 4. Estimate nonparametric survival function of the data.
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Applied Statistics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	APST - 101	Linear Algebra	2018	<ol style="list-style-type: none"> 5. Students understood for estimation of elementary transformations in matrix and their solutions. 6. Students learnt about characteristic roots and vectors with numerical examples. They also know theoretical proofs of theorems. 7. Discriminate between diagonalizable and non-diagonalizable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms 8. Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in

	APST - 102	Probability Theory	2018	<p>4. Students must have knowledge about random variables, expectations, sets and their properties and inequalities where ever necessary.</p> <p>5. Students also know the weak law, strong law and central limit theorem and their importance.</p> <p>6. Students get the knowledge of the Central limit theorem and their real life uses.</p> <p>Students can get the knowledge of the inequalities of probability and their uses.</p>
	APST - 103	Distribution Theory	2018	<p>5. Students know about different continuous and discrete distributions and their properties.</p> <p>6. They have awareness about central and non-central sampling distributions and order Statistics. Idea about simple, partial and multiple correlation coefficients.</p> <p>7. Students get the knowledge of the statistical Tests and their real life uses and applications.</p> <p>8. Students get the knowledge of Regression and Correlations and their real-life applications</p>
	APST - 104	Practical-I (75 Practical + 25 Record)	2018	<p>4. Numerical problems related to, Linear Algebra and Sampling Techniques are solved by executing programs of computers.</p> <p>5. Linear algebra concepts when working with data preparation, such as one hot encoding and dimensionality reduction.</p> <p>6. Applying linear algebra problems in real life situations.</p>

	APST - 105	Statistical Computing	2018	<p>4. Students get the basic Programming Skills of C and C++.</p> <p>5. Students learnt how the Data entre in the Excel with Headings.</p> <p>6. Students get the knowledge of creating data ase using the MS-Access.</p> <p>Students get the knowledge how to create the reports using MS-EXCEL and MS ACCESS.</p>
	APST - 106	Human Values and Professional Ethics-I	2018	<p>5. Students get the knowledge of the Ethical values.</p> <p>6. Students get the idea about the Value education.</p> <p>7. Students learn how to behave in Society.</p> <p>8. Students get the knowledge of the Bhagavat Geetha and Can apply in their life's.</p>
	APST - 201	Statistical Inference	2018	<p>4. Students know about point estimation, non-parametric models, Game theory, theorems and Proofs where ever necessary.</p> <p>5. They can understand the concept of random sample from a distribution,sampling distribution of statistic,standard error of important estimates such as mean and proportions.</p> <p>6. Students may gain the knowledge of testing of hypotheses (both large sample test and small sample test).</p> <p>They can also calculate the problems related to point estimation and interval estimation.</p>

	APST - 202	Multivariate Analysis	2018	<ol style="list-style-type: none">4. Students learnt about importance of multivariate variables and their distributions5. T^2, D^2, MANOVA models are understood and know it's importance.6. Implement dimension reduction techniques using software on real life problems. <p>Classification analysis methods explained according to their classification algorithm.</p>
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	APST-203 A & B & C	<p>(a) Linear Models and Applied Regression Analysis</p> <p>(b) Stochastic Processes</p> <p>(c) Mathematical Analysis</p>	2018	<p>A. Linear Models and Applied Regression Analysis</p> <ol style="list-style-type: none"> 4. Students learnt about different linear and non-linear regression models and their appropriate computational procedures. 5. They know R^2, adjusted R^2 and C_p criteria for model selection. 6. They will get the knowledge of building and fitting linear regression models with software. <p>They also learn about the theory underlying point estimation, hypothesis and confidence intervals for linear regression models.</p> <p>(b) Stochastic Processes</p> <ol style="list-style-type: none"> 5. Students understood stochastic processes, Markov chains, Poisson process, Renewal theory, Branching process, etc. 6. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. 7. Understand the consequences of the Intermediate value theorem for continuous function. 8. Know the chain rule and use it to find derivatives of composite functions and obtain expression for higher order derivatives of a function using the rule of differentiation. Solve integrals and evaluation of multiple integrals with numerical problems. <p>(c) Mathematical Analysis</p> <ol style="list-style-type: none"> 4. Students get the knowledge of real no.'s and set theory and their theories. 5. Students easily earn the knowledge of the sequencing theory.
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	APST - 204	Practical-II (75 Practical + 15 Viva- voce + 10 Record)	2018	<p>4. Students know about the solving of Numerical problems related to Multivariate data.</p> <p>5. Students can learn how the Statistical tests uses in their real life's by doing the tests on the Real times Data.</p> <p>6. They can also use the statistical tools and techniques for analyzing the statistical data.</p> <p>Students can solve the agriculture related problems using the Regression Methods.</p>
	APST - 205	Sampling Techniques	2018	<p>5. Students learnt different sampling techniques of with replacement/ without replacement and Different sampling models.</p> <p>6. Students studied non-Sampling errors and different remedies.</p> <p>7. Implement Cluster sampling, Ratio and Regression estimation in real life problems</p> <p>8. Apply unequal probability sampling designs viz. PPSWR, PPSWOR including Lahiri's method and</p>
	APST - 206	Human Values and Professional Ethics-II	2018	<p>5. Students get the Knowledge of Status of Women in the family and society.</p> <p>6. Students get the idea of the Medical Rights and Their responsibilities in the medical practitioners.</p> <p>7. Students get the idea about the environmental Ethics.</p> <p>8. Students Get the knowledge of Human Rights</p>

	APST - 301	Applied Econometrics	2018	<ol style="list-style-type: none"> 1. Students learnt heteroscedasticity, multicollinearity and autocorrelation and their estimation procedures. 2. Students understood about different lag models and simultaneous linear equations model with their estimation methods. 3. Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model. 4. Understand the assumptions upon which different econometric methods are based and their
	APST - 302	Experimental Design and Applications	2018	<p>Students learnt ANOVA, ANCOVA technique for one way and two-way classifications. Multiple comparisons tests using Tukey's, Duncans, Sheffe's and Dunnet's tests.</p> <p>Students understood about Latin squares and their construction, missing plot technique etc.</p> <p>Students explained about Incomplete Block Designs and their analysis, etc.</p> <p>Understand the basic terms used in design of experiments by using appropriate experimental methods.</p>
	APST -303	Applied Operations Research	2018	<ol style="list-style-type: none"> 1. Students understood about Dual primal, Revised simplex methods. 2. Students learnt non-linear programming, integer programming, CPM, PERT, different models of games. 3. Students can think the real-life problems in the way of Linear Programming Problems and try to solve the problems in Mathematical Way. 4. Students can take a decision in real life by Using the

	APST -304	Practical	2018	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. <p>Students can understand how the statistics use in biological aspects.</p>
	APST-305A	(a)Bio-Statistics	2018	<ol style="list-style-type: none"> 5. Students learnt about biological assay, their distribution and theorems, dose response relationships, basic concepts of biological assay, estimation methods of gene frequencies, etc. 6. Describe single and multi-species population growth models. 7. Apply the concept of deterministic and stochastic models on simple and general epidemics.
	APST - 306	(a) Statistics for Biological and Earth Sciences	2018	<p>a) Statistics for Biological and Earth Sciences</p> <ol style="list-style-type: none"> 5. Students learnt about Graphs, measures of averages, measures of dispersion etc. 6. Students understood about Basic probability and important distributions with workout examples. 7. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests with examples. 8. Students used Advanced statistics tools with working illustrations.

	APST - 401	Applied Forecasting Methods	2018	<ol style="list-style-type: none"> 1. 1. Students understood Time series analysis with some important growth models and their fitting 2. Students forecasting using regression, non-linear regression techniques, single, double, triple and adoptive exponential smoothing models. 3. Students obtained knowledge on AR, MA, ARMA, ARIMA, models fitting, diagnostic checking, etc. <p>Check and validate models with its residual analysis and diagnostic checking.</p>
	APST - 402	Applied Demography and Official Statistics	2018	<ol style="list-style-type: none"> 5. Students know the growth rates, life tables, GRR, NRR and growth models. 6. Students understood about gene frequencies, genotypes, phenotypes etc. 7. Students learnt about population census methods, organizations in India and their functions. 8. Useful to students as a means of analyzing and predicting social, cultural, and economic trends related to population.
	APST - 403	Reliability Theory & Survival Analysis	2018	<ol style="list-style-type: none"> 1. Students learnt about and survival analysis with their related distributions, relationships, non-parametric methods for computing survival analysis. 2. Estimate nonparametric survival function of the data. 3. Explain test of exponentiality against nonparametric classes, two sample problems. <p>Understand the elements of reliability, hazard function and its applications.</p>

	APST - 404	Practical-IV (75 Practical + 15 Viva-voce + 10 Record)	2018	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. 4. Students can understand how the statistics use in biological aspects.
	APST-405 A	(a) Statistical Process and Quality Control	2018	<ol style="list-style-type: none"> 1. Students understood the basic concepts of control charts for variables and their indices. 2. Students performed different control charts like Shewart's moving average, multivariate etc. with their applications. 3. Students used different sequential sampling plans and six sigma tool etc. in solving the problems. 4. Students have awareness about Total Quality Management.
	APST-405 B	Statistics for research, industry and Communitydevelopment	2018	<ol style="list-style-type: none"> 5. Students have done Simulation models, response surface models, demand analysis, social survey and their related measures. 6. Students can understand the basic of research blooms taxonomy of learning levels. 7. Find the topic from current research in statistics education. 8. Students can apply the tools in design, research and

	APST-405 C	Actuarial Statistics	2018	<ol style="list-style-type: none"> 1. Students get the knowledge of the Economic interest rates and discount rates. 2. Students know how to construct the life tables based on the Expectancy. 3. Students to get awareness of the life annuities. 4. Students ensure how to build joint life annuities and life survivor annuities.
	APST - 406 A	Statistics for Marketing Research	2018	<ol style="list-style-type: none"> 1. Students learnt about Research design and how to frame questionnaire etc. 2. Statistics relating to research like univariate test like Z, t, F, ANOVA, CRD, RBD and LSD are done. 3. Multivariate statistical techniques like factor analysis, dissemination analysis and cluster analysis are used. 4. Students can understand how the marketing is happening in the real life.

	APST-406 B	(b) Statistical analysis using SPSS	2018	<ol style="list-style-type: none"> 1. Able to create and manipulate vectors, matrices, arrays, data frames and lists. 2. Should be able to work with character data, factor data and dates. 3. Able to write scripts and function in R and read data from .csv files, EXCEL files and SPSS files. <p>Able to use built-in functions to answer questions relating</p>
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43. Virology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	VR-101	General Microbiology	2018	<ul style="list-style-type: none"> - To learn about fundamentals aspects of microbiology including origin, evolution of microorganisms, different groups of microorganisms and their importance, microscopy principles and applications, morphology, and structure of bacteria, - To learn about Microbiological media, isolation, cultivation and enumeration methods of microorganisms, microbial growth characteristics, maintenance, and preservation of microbial cultures. - To develop knowledge on microbial taxonomy, transport of nutrients in microbes, control strategies of microorganism, - To develop knowledge on general characteristics, structure and reproduction of fungi, algae, and protozoan parasites.
2	VR-102	General Virology	2018	<ul style="list-style-type: none"> - Learn the discovery, nature, origin and evolution of viruses and the physical, biochemical, and biological properties of viruses, criteria used for nomenclature and classification of bacteria, plant and animal viruses.

				<ul style="list-style-type: none"> - Describe the methods used for isolation, cultivation, and purification of viruses and criteria of purity. - Define biological, physical, biochemical, and serological methods used for quantitation of viruses, major characteristics of important plant and animal virus families and biology and applications of major RNA and DNA viruses of insects. - Understand the biology of major bacteriophages, algal and fungal viruses, subviral agents and importance of viruses in human welfare with suitable examples.
3	VR-103	General Microbiology and Virology	2018	<ul style="list-style-type: none"> - Define laboratory safety measures that need to be followed in Virology and Microbiology laboratories and know the concepts and protocols of using different sterilization methods and preparation of media. - Acquire the practical skills to use various methods for cultivation, staining and characterization of different microorganisms and to check their stability under various conditions. - Learn to isolate bacteriophages from different sources and cultivate viruses in embryonated eggs and plants. - Demonstrate the mechanical, aphid and graft transmission of plant viruses and methods used to check the stability of viruses and determine the effect of virus infection on plants through chlorophyll estimation.
4	VR-104	Biological Chemistry and Analytical Techniques	2018	<ul style="list-style-type: none"> - : Learn to calculate normality, molarity, molecular weight and percentage of chemical substances and qualitative and quantitative estimation of proteins, carbohydrates, lipids, and nucleic acids.

				<ul style="list-style-type: none"> - Know how to isolate and check the activity of enzymes from various sources. - Learn to use ultrafiltration, chromatography, and electrophoresis techniques for isolation and characterization of biomolecules. - Acquire the skills to use spectroscopic and centrifugal methods for isolation and characterization of biomolecules apply this practical oriented knowledge in Cell Biology and Immunology to foster employability in private industries, higher education in premier institutes.
5	VR-105	Biological Chemistry and Analytical Techniques	2018	<ul style="list-style-type: none"> - Acquire knowledge on major elements and biomolecules of life and their chemical composition, bonding and primary characteristics, classification, structure, functions of carbohydrates, nucleic acids, amino acids, peptides, proteins and lipids and mechanism of protein synthesis and degradation. - Understand the types, properties, biological functions of enzymes, nucleic acids, hormones, growth regulators, vitamins, porphyrins and other pigments and nucleic acid metabolism. - Describe the approaches involved in characterization and concentration of biomolecules and discuss the principles and applications of various techniques applied for characterization of biomolecules in biological research such as chromatography, centrifugation, electrophoresis, - Learn about electrochemical techniques, basic principles and applications of flow cytometry, radioisotopes, spectroscopy, amino acid, and nucleotide sequencers
6	VR-106	Human values and Professional ethics - I	2018	<ul style="list-style-type: none"> - To enable the students to imbibe and internalize the moral values and ethical principles - 2. To learn ethics moral and social values and ethical behavior in the personal and Professional lives. - 3.To learn the rights and responsibilities and to appreciate the rights of others and to create awareness on religious values and other good acts and facts of life. - 4.To acquire knowledge about the important facts of Bhagavad Gita, values hidden in religions, religious tolerance and aware of crime, and punishment theories

8	VR-201	Microbial Genetics and Molecular Biology	2018	<ul style="list-style-type: none"> - To gain understanding of prokaryotic and eukaryotic genome organization, modern concept of genes, plasmids, mobile genetic elements - To learn gene transfer and mapping mechanisms in bacteria, genetics of viruses and requirements and mechanism of DNA replication. - To attain knowledge about the mechanism of DNA damage and repair, concept of mutations and their importance, processes involved in transcription, - To attain knowledge about the mechanism of translation, regulation of gene expression and gene silencing mechanisms.
9	VR-202	Recombinant DNA Technology	2018	<ul style="list-style-type: none"> - To learn basic and advanced tools and techniques, approaches and strategies used in gene manipulation in prokaryotic and eukaryotic systems. - 2. To learn the major techniques and applications of gene manipulation such as DNA sequencing, nucleic acid hybridization - 3. To understand the strategies used for gene expression in heterologous hosts, proteomics, genomics. - 4. To generate knowledge on genetically modified plants and animals and applications/implications of genetic engineering in agriculture, medicine, industry, and biology.
10	VR-203	Microbial Genetics and Molecular Biology & Recombinant DNA Technology	2018	<ul style="list-style-type: none"> - Learn the safety practices and precautions to be followed in setting up Cell and Molecular Biology laboratory with ribonuclease free environment. - Isolate and estimate DNA and RNA from microbial, plant and animal tissues and demonstrate curing of plasmids, replica plating techniques, conjugation in bacteria, Ames test, induction of mutations in bacteria by physical/chemical agents, isolation of microbial mutants by gradient plate method. - Acquire practical skills to isolate plasmids from bacteria, restriction enzyme digestion of recombinant plasmid DNA, recovery of DNA from gels, transformation of bacteria and demonstrate the preparation of southern and dot blots for hybridization.

				<ul style="list-style-type: none"> - Solve the problems related to Molecular Genetics/Biology and Recombinant DNA Technology and compete for the competitive exams such as UGC-CSIR-NET, GATE, APSET and other scientific examinations.
11	VR-204	Cell biology and Immunology	2018	<ul style="list-style-type: none"> - Acquire the practical skills in conducting various experiments related to Cell Biology such as isolation of cells, preparation of cell cultures. - Learn isolation of mitochondria, study of chromosomes, identification of stages of mitosis in onion root tips. - Identify of primary and secondary lymphoid organs in virtual animal model and illustrate basic immunology techniques such as counting of RBC and WBC, estimation of hemoglobin, identification of the blood groups and Rh. - Demonstrate antigen-antibody interactions by conducting <i>in vitro</i> serological tests such as immunodiffusion and immune-electrophoresis, DAC-ELISA, Dot-ELISA and western blotting and apply this practical oriented knowledge in Cell Biology and Immunology to foster employability in private industries, higher education in premier institutes.
12	VR-205	Cell biology and Immunology	2018	<ol style="list-style-type: none"> 1. To understand the structure and contents of prokaryotic and eukaryotic cells, general principles and pathways of cell communication and cell signaling. 2. To describe the concepts and methodologies of plant and animal tissue and organ cultures, cell counting and introduction to stem cell cultures. 3. To learn about the historical perspectives of immunology, innate and adaptive immunity mechanisms, various components of immune system, antigens, antibodies, <i>in vitro</i> and <i>in vivo</i> antigen and antibody interactions and 4. To understand the mechanism of humoral and cell mediated immune responses, immune effector mechanisms, MHCs, hypersensitivity reactions, autoimmune and immunodeficiency disorders, transplantation and transfusion immunology and concepts and applications of conventional and modern vaccines.

13	VR-206	Human values and Professional ethics - II	2018	<ul style="list-style-type: none"> - Understand the definition of value education, concept of human and family values, components, structure, and responsibilities of family system and acquire reflective thinking, rational skepticism. - Describe the moral responsibilities and ethical issues of medical and health care professionals, avoid unethical things, learn ethical issues raised in genetic engineering and new biological technologies. - Learn to practice ethical standards in business by understanding ethical theories and maintain work ethics to build trust between businessman and consumer and avoid unethical behavior and ethical abuse and develop scientific temper, digital literacy. - Learn to practice environmental ethics by taking responsibility to protect environment and ecosystem and understand the importance of maintenance of social ethics and ethics of media.
14	VR-301	Plant Virology	2018	<ul style="list-style-type: none"> - Understand the induction of plant virus diseases, virus-host interactions and movement strategies. - Learn the vector and non-vector modes of plant virus transmission, virus-vector relationships and molecular mechanisms involved in virus vector interactions and the approaches used for identification and characterization of the viruses and virus strains. - Acquire the knowledge on plant virus spread and survival in nature and approaches used to detect plant viruses and diseases. - Describe the approaches used for the control and management of plant viruses and vectors and strategies used for acquiring plant virus resistance.
15	VR-302	Plant Viruses and Diseases	2018	<ul style="list-style-type: none"> - To understand the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of cereals and millets, oil seed crops - To understand the distribution, incidence and impact, symptoms, causal virus

				<p>characteristics, diagnosis, disease cycle and management of the virus diseases of vegetable, and tuber crops.</p> <ul style="list-style-type: none"> - To acquire knowledge on the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of food legumes, fruit crops - To acquire knowledge on the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of cash, spice and beverage crops and flowering and foliage ornamentals.
16	VR-303	Plant Virology or Plant Viruses and Diseases	2018	<ul style="list-style-type: none"> - Identify major virus diseases of local economically important crop plants and weeds through theory exercises, local field surveys, agricultural research station visits. - Determine and compare the effect of virus on cell size, chloroplast number, total carbohydrates, proteins, and lipids with healthy counterparts. - :Detect unknown viruses through ELISA and PCR (theory exercise and practical) and demonstrate plant virus transmission by seed and vegetative propagules and generation of virus free plants through apical meristem tip culture. - Identify local plant virus vectors, determine virus disease incidence, and progress curves through local field visits. -
17	VR-304	a) Molecular Virology (OR) b) Biostatistics and Bioinformatics	2018	<ul style="list-style-type: none"> - Acquire the skills to use the techniques involving purification of viruses such as maintenance of virus cultures on propagation hosts, clarification using organic solvents and low speed centrifugation, precipitation using sodium chloride or ammonium sulphate or polyethylene glycol or differential centrifugation, preparation of step and linear density gradients, further purification of viruses using sucrose density gradient centrifugation and final pelleting by ultrafiltration or ultracentrifugation and to check the quality and quantity of

				<p>viruses using spectroscopy or transmission electron microscopy.</p> <ul style="list-style-type: none"> - Isolate virus coat proteins and determine its quantity and molecular weight through spectroscopy and SDS-PAGE, respectively. - Isolate virus nucleic acids (dsRNA, RNA and DNA), estimate their quantity by spectroscopy, determine their size and molecular weight through agarose gel electrophoresis. Determine the stability of virus by studying effect of physical and chemical agents on virus inactivation.
18	VR-305	<p>(a) Molecular Virology (OR) (b) Biostatistics and Bioinformatics</p>	2018	<ul style="list-style-type: none"> - To understand molecular architecture of viruses and molecular mode of inactivating agents on viruses - To learn about types of viral genomes and steps involved in virus replication and replication strategies of DNA viruses. - 3.To understand basic concepts of statistics, construction of histogram, normal distribution, mean, median and standard deviation, comparison of means and variances, examples of proportion and count data - 4.To learn about analysis of variance, correlation and regression and statistical parameters for biological assays.
19	VR-306	<p>(a) Biology of Viruses and their Management (OR) (b) Biology of Virus Vectors and their Management</p>	2018	<ul style="list-style-type: none"> - To understand the basics of general entomology, collection, preservation, maintenance and transportation of virus vectors and vector-borne viruses of animals and humans - To learn about the biology and ecology of mosquitoes, blood sucking mites and prevention and control methods of animal and human virus vectors in urban and rural settings. - To describe the methods of collection, culturing and identification of plant virus vectors, virus vector transmission mechanisms, - To learn about the soil-borne vectors, epidemiology of vector-borne viruses, management of plant virus vectors and concepts of vector resistant crops
20	VR-401	Animal and Human Virology	2018	<ul style="list-style-type: none"> - To acquire knowledge on virus-host interactions, host innate and adaptive immune response to viruses, molecular mechanisms of viral pathogenesis, - To acquire knowledge on transmission of viruses, mechanism of virus,

				<p>persistence, infection and spread in the body.</p> <ul style="list-style-type: none"> - To learn the epidemiological concepts and methods of virus diseases, measures of disease occurrence, disease determinants, ecology, epidemiology - To learn the surveillance of virus diseases, strategies of virus maintenance in communities, basic concepts, types and patterns of disease survey, prevention, and control methods of viruses.
21	VR-402	Animal and Human Virus Diseases	2018	<ul style="list-style-type: none"> - Learn the safety practices and To describe the etiology, transmission, clinical manifestations, diagnosis, prevention and control of important (+) sense ssRNA viruses infecting animals and humans. - To describe the etiology, transmission, clinical manifestations, diagnosis, prevention and control of important (-) sense ssRNA viruses infecting animals and humans - To understand the etiology, transmission, clinical manifestations, diagnosis, prevention, and control of important DNA viruses infecting animals and human - To learn about the prion diseases, biology, prevention, and management of major viruses of silkworm, poultry, fish and prawn, emerging and reemerging virus diseases. -
22	VR-403	Animal and Human Virology & Animal and human virus diseases	2018	<ul style="list-style-type: none"> - Understand the biosafety, biosecurity, and ethical guidelines to be followed in the Molecular Virology laboratory. - Learn the technologies related to preparation of media for cell/tissue cultures, preparation of cell cultures/embryonated eggs for virus cultivation and isolation and quantitation of viruses using differential centrifugation and symptomatology/spectroscopy, respectively. - Develop skills to test the plant and human viruses using serological and molecular tests and kit-based methods. - Acquire knowledge on virus-based nanotechnology protocols, virus epidemiology by doing extension activities and visiting field, poultry, agriculture research station and aqua forms.

23	VR-404	Project work related to Virology (OR) (a) Applied Virology (OR)	2018	<ul style="list-style-type: none"> - Acquire the skills to prepare the cell cultures and embryonated eggs for cultivation of plant, animal and human viruses and to isolate and quantitate viruses. - Learn the methods to detect plant and animal viruses and able to analyze various types of results obtained from serological and molecular viral diagnostic methods. - Apply the skills acquired to prepare NPV as biopesticides and virus-based nanoparticles and their isolation using analytical methods. - Participate in extension activities and field, poultry, agriculture research station and aqua form visits. -
		(b)Tumor Biology and Viruses	2018	<ul style="list-style-type: none"> - Acquire skills to detect carcinogens and mutagens using standard tests such as Ames test. - Distinguish transformed and normal cell lines and determine the anticancer property of biologically active compounds. - Design and execute PCR and other point of care methods using commercial kits for detection of tumor viruses (HCV, HIV, HPV). - Perform cultivation of poultry tumor viruses in cell cultures and acquiring the knowledge on histopathology of animal tumor viruses. -
24	VR-405	(a) Applied Virology (OR)	2018	<ul style="list-style-type: none"> - Understand the basic concepts, types, requirements and methodologies of plant/animal cell and tissue cultures used for cultivation of plant and animal viruses. - Learn the production of recombinant DNA technology-based antibodies and vaccines to viruses and the concepts and methods of production of virus resistant/tolerant crops and virus-based biopesticides.

				<ul style="list-style-type: none"> - Acquire knowledge about common virus infections caused to human beings through vector and non-vector borne modes and basic principles of biosafety, biosecurity, and ethical/regulatory issues in Virology and basics in Intellectual Property Rights (IPR). - Understand the utilization of viruses as viral genes/sequences as unique genetic resources, novel enzymes, gene expression activators and silencers, gene delivery systems, epitope display platforms and model systems in understanding the replication of nucleic acids and regulation of gene expression strategies and cancer biology, phage display and therapy technologies and viruses as biological weapons.
		b)Tumor Biology and Viruses	2018	<ul style="list-style-type: none"> - Acquire knowledge about the basic aspects of tumors, distinguish normal and transformed cells and describe the role of oncogenes and tumor suppressor genes in causing cancers. - Understand the role and mechanism of carcinogens in inducing carcinogenesis and molecular viral mechanisms of transformation and tumorigenesis. - Describe the role of oncogenes, tumor suppressor genes, viral oncogenes, types, and mechanism of RNA viruses in inducing tumors. - List the DNA viruses causing tumors and learn their tissue transformation mechanisms, role of tumor suppressor genes in tumor suppression, immune mechanisms against tumors, immunotherapy, and physical and chemical therapeutic interventions against tumors
25	VR-406	(a) Clinical Virology (OR)	2018	<ul style="list-style-type: none"> - Acquire basic understanding of virus properties, virus replication and learn methods of virus isolation and characterization of viruses using serological and molecular techniques. - Learn to collect, preserve the virus samples, and detect the viruses using biological, serological, and molecular methods, laboratory biosafety and quality

				<p>control practices.</p> <ul style="list-style-type: none"> - Understand the principles of epidemiology, disease occurrence patterns, disease surveillance and control strategies, concept, and methods of modern vaccines to viruses. - Learn about the approaches used for prevention and control of clinically important infectious caused by human viruses, unconventional slow viruses, and prions.
		(b) Emerging Infectious Viral Diseases		<ul style="list-style-type: none"> - Understand the evolution, biology, epidemiology, and emergence of infectious virus diseases, biology of emerging infectious diseases, zoonotic infections - Learn about the biology, clinical symptoms, epidemiology, diagnosis, and control of viruses causing AIDS and SARS and host defense mechanisms against infectious virus diseases. - Describe the biology, clinical symptoms, epidemiology, diagnosis, and control of vector borne emerging infectious viral diseases. - Acquire knowledge on impact of social and environmental change on emergence of viruses, vector control and antiviral therapies, vaccines, public health measures and bioterrorism.

44. Zoology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ZOO-101	Invertebrata & Chordata	2018	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions,</p>

				<p>the evolutions of life from most primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. In depth understanding of Anatomical features of Integumentary, Circulatory, Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.</p>
2	ZOO-102	Genetics & Evolution	2018	<p>i. Students will appreciate the concept of epigenetics as a key mechanism of regulation of gene expression steering development and cell fate that can ultimately be affected in disease condition</p> <p>ii. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations, Natural Selection and Genetic drift.</p> <p>iv. Understood the concepts of Micro, Macro evolution speciation categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.</p>
3	ZOO-103P	Practical-I Invertebrata & Chordata and Genetics	2018	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. Understanding the comparative aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in taxonomy related research and job opportunities.</p>

				<p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p>
4	ZOO-104P	Practical-II Metabolic Regulation & Cell Function and Evolution	2018	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight into biological processes.</p> <p>iv. Understood that the four propositions underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
5	ZOO-105	Metabolic Regulation & Cell Function	2018	<p>i.The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop</p>

				<p>understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p>
6.	ZOO-106	Human Values and Professional Ethics-I	2018	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
7.	ZOO-201	Cell Biology & Immunology	2018	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the ultra-structural information of animal cell besides the detailed views of the cell interior revealing the various events and actions of cell at the molecular</p>

				<p>level.</p> <p>iii. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the principles of Graft rejection, Auto immunity and Antibody based therapy.</p>
8.	ZOO-202	Molecular Biology	2018	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p> <p>ii. Students world gain expertise in understanding the complex molecular mechanisms occurring in cell and the applications of molecular technologies for betterment of life.</p> <p>iii. Understand and our apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the health Professions.</p>
9.	ZOO-203P	Practical-I Molecular Biology and Cell Biology	2018	<p>i. Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they</p>

				<p>will also know the various tools and techniques related to bacterial microbiology.</p> <p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p>
10.	ZOO-204P	Practical-II Comparative Animal Physiology and Immunology	2018	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fullest.</p> <p>iii. Learn the fundamental principles of immune response including molecular, biochemical and cellular basis of immune homeostasis.</p> <p>iv. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.</p>
11	ZOO-205	Comparative Animal Physiology	2018	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. An appropriate understanding of functioning of each system of different groups of animals with</p>

				<p>their comparison will be acquainted.</p> <p>iii. Understanding of the basic concepts of Physiological regulation, from cellular to organ to organismal.</p> <p>iv. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet.</p>
12	ZOO-206	Human Values and Professional Ethics-II	2018	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	ZOO-301	Developmental Biology	2018	<p>i. Students would gain expertise in explaining how a variety of interacting processes generate an organism's heterogenous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p> <p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity complex and coordinated systems in organisms the students can apply this knowledge for research, and education, to solve the problems related to development in animals</p>

				through research.
14	ZOO-302	Environmental Biology	2018	<p>i. Students will be able to apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.</p> <p>ii. Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.</p> <p>iii. Students will be able to be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p> <p>iv. Students will be able to use technology, such as geographical information systems and computer programming, to assist in problem solving.</p>
15	ZOO-303P	Developmental Biology and Tools & Techniques	2018	<p>i. Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>iv. Students would gain basic knowledge of the underlying principles and practical strategy of the</p>

				analytical and preparative techniques that are fundamental to study and understanding of life processes.
16	ZOO-304P	Environmental Biology and Enzymology	2018	<p>i. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to Education, Research and Extension programmes in his further career.</p> <p>ii. Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>iii. Students learn about enzymes. Their classification and nomenclature</p> <p>iv. Students learn about specificity of enzymes</p> <p>v. Students learn about measurement of enzymatic activity</p> <p>vi. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.</p>
17	ZOO-305A	Tools & Techniques	2018	<p>i. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>ii. Identify and describe the different equipment and tools used in a biology laboratory.</p> <p>iii. Correctly operate different laboratory instruments.</p> <p>iv. Correctly operate different types of</p>

				<p>microscopes.</p> <p>v. Prepare tissue for section cutting and correctly operate a microtome.</p>
18	ZOO-305B	Enzymology	2018	<p>i. Students gain knowledge about regulation of enzyme activity with respective mechanisms</p> <p>ii. To understand about mechanism of enzymes in clinical diagnosis and their applications</p> <p>iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.</p>
19	ZOO-305C	Bioinformatics & Biostatistics	2018	<p>i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology.</p> <p>ii. Describe different methods of data handling using computer.</p> <p>iii. Perform basic operations of gene sequence retrieval and compare them using different software.</p> <p>iv. Perform basic operations of protein structure retrieval and comparison using different software.</p> <p>v. The student will learn about the Computer basics like Operating systems, Programming, Data Access, Internet and Nucleic acid Sequence and Protein Data Banks.</p> <p>vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of dispersion like Mean deviation and Standard deviation and Co-efficient of Variation.</p> <p>v. The course will aid in learning Test of significance like Null hypothesis and Alternative hypothesis, t-test, F-test, Chi-square test,</p>

				Correlation and Regression analysis.
20	ZOO-306A	Economic Zoology	2018	<p>i. Creating the self-employment opportunities to rural students through Animal husbandry, Aquaculture, Vermiculture and Sericulture.</p> <p>ii. To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices.</p> <p>iii. Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.</p>
21	ZOO-306B	Genetic Engineering	2018	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p> <p>ii. Students will be able to perform basic genetic engineering experiments at the end of course.</p> <p>iii. Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.</p>
	ZOO-306C	Human Health and Infectious diseases	2018	<p>i. To understand the basic concepts of Infectious diseases and the role of immunity to control infections</p> <p>ii. Provides knowledge on the physiological mechanisms leading to diseased conditions.</p> <p>iii. Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv. This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>
22	ZOO-401	Neurobiology	2018	<p>i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials</p> <p>ii. Students leant and gain knowledge on structure</p>

				and function of different types of Synapses iii. Gained information on different types of Neurotransmitters i.e. Amino acids and Peptides.
23	ZOO-402	Toxicology	2018	<p>i. The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research.</p> <p>ii. Understanding of the physiological and genotoxic effects of drugs and environmental toxins.</p> <p>iii. To understand various types of insecticides and understand their mode of action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible with other control strategies.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p>
24	ZOO-403P	Neurobiology and Animal Biotechnology & Microbiology	2018	<p>i. Learnt about structure, function and organization of Neurons in the Central nervous system</p> <p>ii. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials.</p> <p>iii. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny.</p> <p>iv. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effective communicate with both specialist and non-</p>

				specialist audiences/community.
25	ZOO-404P	Toxicology and Animal Behavior & Wild life	2018	<ul style="list-style-type: none"> i. Skill development in environmental and occupational Toxicology. ii. It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain. iii. Identification of different routes of exposure of environmental toxins. iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning. v. To understand the overview of Animal Behavior and prominence of social organization in insects and primates. vi. Gained lot of information on different types of Learning phenomenon and their mechanisms. vii. To understand how to conserve the wild animals
26	ZOO-405A	Animal Biotechnology & Microbiology	2018	<ul style="list-style-type: none"> i. Understanding of in vitro culturing of organisms and production of transgenic animals. ii. Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors. iii. This insight allows students to take into consideration about ethical issues involved in production of transgenic animals and BT products. iv. Use in gene transfer technology, genetic

				<p>manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p> <p>v. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny</p> <p>vi. Classify the nutritional types of microorganisms and measure microbial growth</p> <p>vii. Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>viii. Assess impact of plant- microbe interaction on agriculture in both beneficial and detrimental ways. Identify industrially important microbes.</p>
27	ZOO-405B	Animal Behavior & Wild life	2018	<p>i. Understand the overview of Animal Behavior and prominence of social organization in insects and primates</p> <p>ii. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>iii. To understand the how to conserve wild animals and management strategies.</p> <p>iv. To gain the knowledge about wild animals and animal products importance.</p>
28	ZOO-405C	Endocrinology	2018	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic pathways.</p>

				<p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
29	ZOO-406A	Environmental Impact Assessment & Green Auditing	2018	<p>i. Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment</p> <p>ii. Explain the importance of environmental audits and other management tools in business for social benefit by improving environmental performance</p> <p>iii. Calculate the carbon footprint of any organization and identify suitable mitigation strategies for carbon reduction solutions.</p>
30	ZOO-406B	Structural Biology	2018	<p>i. Understand the evolution of protein structural motifs and domains and associate this with function;</p> <p>ii. Use on-line structural databases and tools to predict the properties, structure and function of proteins.</p> <p>iii. Understand and explain enzyme mechanisms in a structural context.</p> <p>iv. Describe mechanisms of protein folding and the roles of natively unstructured proteins in biology.</p> <p>v. Understand how cross-talk between proteins and post-translational protein modifications (e.g. phosphorylation, ubiquitination) facilitate information processing in cells.</p>
31	ZOO-406C	Pathobiology	2018	<p>i. To understand the different pathogens causing disease in man.</p> <p>ii. Describe the different parasites causing disease and disability in man and animals.</p>

				<p>iii. Ability to elaborate about the life cycle and biology of disease carrying vectors; suggest preventive and control measures for the said diseases.</p> <p>iv. An understanding of the relationship between changes in physiology of host and</p> <p>v. The students after completion of the course based on the Expertise he/she may join as Parasitological Scientist.</p>
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Animal Biotechnology

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/Skill Development
1	ABT- Core-101	Metabolic Regulation & Cell Function (MRCF)	2018	<ul style="list-style-type: none"> • Knowledge on chemical bonds, thermodynamics principles and metabolisms of Glycolysis, TCA Cycle and their biomedical importance will be gained. • Metabolic disorders of urea cycle and importance of proteins structure and functions can be understood. • Biosynthesis of purine and pyrimidine nucleotide and Clinical disorders of purine and pyrimidine metabolism can be learnt • To become proficient in Biomedical importance of lipids and over view metabolism of carbohydrate, protein and lipids

2	ABT- Core-102	Tools & Techniques (TT)	2018	<ul style="list-style-type: none"> • Skills will be acquired on chromatography, centrifugation, electrophoresis and blotting techniques • To get knowledge on cell and tissue culture, cell types, culture media and overview of stem cell biology • To acquire skill on electrganetic spectrum, type of detectors, electophysiological methods and brain activity recording techniques • Microscopic techniques, different fixation and staining techniques, tissue processing for microtomy, cryotechiques will be learnt
3	ABT-Core-P-103	Metabolic Regulation & Cell Function	2018	<ul style="list-style-type: none"> • Practical knowledge will be gained on biochemical assays like estimation of proteins, structural proteins, soluble proteins, free amino acids, total carbohydrates and total cholesterol. • To gain knowledge in handling equipments like cooling centrifuge, autoclave, laminar air flow etc., and, maintenance of animal cell culture laboratory. <p>To learn microbial media preparation for their culture and identification</p>
4	ABT-Core-P-104	Tools & Techniques	2018	<ul style="list-style-type: none"> • Isolation of DNA from chick liver • Agarose gel electrophoresis • Estimation of DNA and RNA by diphenyl anime method and orcinal method • Paper chromatography • Platting procedures • Gram staining • Anti microbial susceptibilities test

5	ABT-CF-105	Microbiology and Diseases	2018	<ul style="list-style-type: none"> • Microorganisms classification and structure of prokaryotic and eukaryotic microorganism can be understood • To get knowledge on Nutritional requirements to microorganisms, growth of microorganism, control of microorganism and microbes of biotechnological importance • To become proficient in chemical nature of gene, plasmids incompatibility, horizontal transfer of genome among the microbial community and Benzer's classical studied on II locus • To learn diseases caused by microorganism
6	ABT -EF-106	Human Values & Professional Ethics (HVPE)-I	2018	<ul style="list-style-type: none"> • Knowledge will be gained on nature of ethics its relation to religion. Politics, Business • To understand nature of values Good and Bad, end and means, analysis of basic moral concepts, good behavior and respect for elders, character and conduct • Proficient on hagavad Githa • Crime and theories of punishment will be learnt
7	ABT- Core-201	Molecular Biology (MB)	2018	<ul style="list-style-type: none"> • To gain knowledge on DNA structure, genome of Nuclear and mitochondrial and maternal Inheritance • To understand replication in prokaryotes, Enzymology of DNA replication, Discontinuous replication and Bidirectional replication • Synthesis of RNA, Types of RNA, Genetic code and Ribosome structure will be understood <p>Knowledge will be gained regulation I and II and Operon concepts</p>

8	ABT- Core-202	Animal Cell culture & Stem Cell Biology (ACC-SCB)	2018	<ul style="list-style-type: none"> • To understand animal cell culture, biology of stemcells and embryonic stem cell • To learn propagation of embryonic stem cells, nuclear transfer technology, animal cloning and stem cell differentiation • To gain knowledge on stem cell plasticity, stem cell assay and protocols, stem cell separations and stem cell therapies <p>To learn stem cells and tissue engineering, human embryonic stem cells and society, intellectual property results</p>
9	ABT-Core-P-203	Molecular Biology & Immunology	2018	<ul style="list-style-type: none"> • Effect of UV radiation on bacterial growth • SDS PAGE • Electrophoresis • Blood grouping • Blood smear preparation • RBC count • Radial Immuno Diffusion • Neubauer chaber
10	ABT-Core-P-204	Animal Cell culture & Stem Cell Biology & Cell Biology	2018	<ul style="list-style-type: none"> • Laboratory safety rules and regulations • Animal handling and care • Preparation of cell culture media • Staining of animal cells • Preparation of cell lines • Culture of virus in chick embryo
11	ABT- CF-205	Cell Biology & Immunology (CB&IM)	2018	<ul style="list-style-type: none"> • Able to learn organization of prokaryotic and eukaryotic cell, Nucleus structure, Eukaryotic chromosome and polytene and lamp brush chromosomes • To learn mechanism of cell division, regulation of eukaryotic cellcycle, chromosomal

				<p>abnormalities and tumor biology</p> <ul style="list-style-type: none"> To understand types of immunity, types of cell involved in immune response, structure and function of antibody and complementarily cascade To gain knowledge on Antigen presentation, hypersensitivity reactions, immune tolerance and immunopathology
12	ABT- EF-206	Human Values & Professional Ethics (HVPE)-II	2018	<ul style="list-style-type: none"> To gain knowledge on value education To learn medical ethics To become proficient on business ethics To understand environmental ethics and social ethics
13	ABT- Core-301	Enzymology (ENZ)	2018	<ul style="list-style-type: none"> To understand enzyme specificity, enzyme catalysis and isolation and purification of enzymes To gain knowledge on theories of enzymes kinetics, enzyme kinetics and its importance, effect of reactant concentrations and effect of temperature of pH and enzyme concentration reaction rate To become proficient on clinical aspects of enzymology, immobilized enzymes, isoenzymes and enzyme engineering
14	ABT- Core-302	Animal Reproduction, Breeding & Transgenic Technology (ARBTT)	2018	<ul style="list-style-type: none"> To become proficient on structure and function of male and female reproductive system; reproductive cycles and contraception in male and females To gain skill on sex determination, selection for qualitative inherited characters, parental determination and verification and progeny testing To understand artificial insemination techniques, in vitro fertilization, embryo transfer technology, microinjection and macroinjection To learn transgenic technology development, generation of chimeric, transgenic

				and knockout mice
15	ABT-Core-P-303	Enzymology & Genetic Engineering	2018	<ul style="list-style-type: none"> • To determine the effect of substrate concentration, enzyme concentration and temperature on enzyme activity • Measures of central tendency • regression and correlation analysis • T-test
16	ABT-Core-P-304	Animal Reproduction, Breeding & Transgenic Technology & Environmental Biotechnology	2018	<ul style="list-style-type: none"> • To estimate the sperm motility, sperm count , sperm membrane integrity test and pH of semen. • Determination sperm viability • Retrieval of gene and protein sequence from gene and protein bank, redelivery
17	GE-305A	Cancer Biology	2018	<ul style="list-style-type: none"> • To gain knowledge on cancer types and tumor development • To learn oncogenes, mechanisms of onogene activation and chromosomal translocation • To understand cell cycle regulation and cancer, DNA Damage and repair • To learn tumor immunology, Vaccine development, tumor cell evasion of immune defenses
18	GE-305B	Environmental Biotechnology (EBT)	2018	<ul style="list-style-type: none"> • To gain knowledge on waste and pollutants, hazards from wastes and pollutants and hazards from chemicals in wastes • Waste treatment, treatment of liquid wastes, treatment of solid waste and contributions of biotechnology to waste treatment will be

				<p>understood</p> <ul style="list-style-type: none"> To become proficient in aerobic waste water treatment and measurement of pollution levels To learn anaerobic treatment of waste water, biodegradation of xenobiotics compounds, hazards from xenobiotics and bioremediation
19	GE-305C	Biostatistics & Bioinformatics	2018	<ul style="list-style-type: none"> To understand prediction of protein structure and protein sequence database, prediction of gene structure, submission of sequence to database, phylogenetic analysis To learn biostatistics, measures of location and dispersion, curve fitting and correlation and regression To understand probability distribution, tests of significance, student t-test and F-test, chi square test and their application
20	OE-306A	Animal Biotechnology & Industrial Applications	2018	<ul style="list-style-type: none"> To gain knowledge on preservation animals engineered bacteria/yeast/ cell lines, metabolic engineering, fermentative production and glycolytic pathway To understand monoclonal antibodies production and genetically engineered products To know the DBT guidelines, Global scenario of transgenic micro organisms and ethical issues related to biotechnology products
21	OE-306B	Genetic Engineering (GE)	2018	<ul style="list-style-type: none"> Use of enzymes in DNA and RNA synthesis, restriction enzymes and ligation and modification o DNA To learn vectors for constructions of genomic libraries, expression vectors, promoters and vectors used for cloning

				<ul style="list-style-type: none"> • To gain knowledge on DNA fragments, cDNA synthesis, PCR • To become proficient on ligation between cohesive and blunt end DNA fragments, introduction of cloned genes into host and expression of cloned genes
22	ABT- Core- 401	Medical Biotechnology (MBT)	2018	<ul style="list-style-type: none"> • To understand disease diagnosis, use of monoclonal antibodies in detection of genetic disease • To learn Disease treatment, interferons, growth factor, and antisense nucleotide as therapeutic agent • To gain knowledge on gene therapy, types of gene therapy, augmentation therapy and targeted transfer • To become proficient on forensic medicine, preparation of DNA sample. Approaches for DNA analysis and applications of forensic medicine
23	ABT- Core- 402	Fermentation Technology and Downstreaming Process (FTDSP)	2018	<ul style="list-style-type: none"> • To understand cell distribution methods, separation techniques, purification by chromatographic techniques and isolation and screening and maintenance of industrially importance microbes • To learn bioreactor design, fermentation economics, upstream processing, membrane based separations <p>To gain knowledge on importance of downstream processing economics of downstream processing</p>

24	ABT-Core-P-403& 404	Project and Viva- Voce	2018	<ul style="list-style-type: none"> Students must perform project work which includes experiments related to Toxicology, Animal Tissue culture, Fermentation technology or any work related to biology. <p>After completion of project work students have to prepare dissertation by their own and submit to the committee members.</p> <ul style="list-style-type: none"> Evaluation of dissertation will be conducted by committee members through Viva-Voce
25	GE-405A	Biosafety, Bio Ethics & Intellectual Property rights	2018	<ul style="list-style-type: none"> To understand socio-economic and legal impact of biotechnology, use of genetically modified organisms, moral and ethical issues in biotechnology and safety issues with GMO To learn intellectual property right, evaluation of patenting, application of GATT and IPR and WTO Act and global and Indian biodiversity To gain knowledge on Indian Patent Act 1970, role of country patent office, U.S. Patent trademark office and U.S. Paten system Vs Indian Patent system To gain knowledge on Ethics and genetic engineering, patent of genes, human cloning, stem cell, regulatory requirements for drugs and biologics, GLP and GMP
26	GE-405B	Drug design and Development	2018	<ul style="list-style-type: none"> To learn drug design, analog approach of drug designing To understand SAR Vs QSAR, Partition coefficient, Hammets substituent constant and Tafts steric constant, Free Wilson mode, 3D-QSAR approach like COMFA and COMIA To gain knowledge on pharmacological

				<p>screening and assays, pharmacological screening models for therapeutic areas, cell based assay, biochemical assay, radiological binding assay, small molecule manufacturing</p> <ul style="list-style-type: none"> • To learn Drug Laws, FDA, OECD, ICH, Schedule Y, drug registration, Regulations of human pharmaceuticals and biological products, and clinical trial design
27	GE-405C	Animal Cell Culture Techniques	2018	<ul style="list-style-type: none"> • To understand Animal cell culture, culture medium, characteristics of cell in culture, measurement of viability and cytotoxicity , cell types and apoptosis • To gain knowledge in scaling up of animal cell culture, cell transformation, tissue engineering, transgenic animals, animal cloning • To become proficient in improvement of biomass, pharming products, plasminogen activator and ethical issues related to biotechnology products
28	OE-406A	Advanced Genomics and Proteomics	2018	<ul style="list-style-type: none"> • To learn structure of Prokaryotic and Eukaryotic genomes, Isolation and purification of genomic DNA, Construction of Physical maps and Whole genome sequence alignment • To understand genome annotation, methods for gene identification, functional genomics, transcript profiling • To learn protein structure, sample preparation and separation 2D-analysis, Multidimensional liquid chromatography, protein-protein interactions analysis <p>To gain knowledge on DNA /protein sequence</p>

				homologies, Gene duplication and
29	OE-406B	Bio resource Technology (Apiculture, Sericulture , Aquaculture, Vermiculture)	2018	<ul style="list-style-type: none"> • To understand Types of honey bees, life history of honey bees, management of apiculture and by products of honey bees and economic importance disease and their control • To become proficient on fresh water fin fish culture, shell fish (prawn and Pearls) culture • To understand historical background of vermicompost, methods of vermiculture and problems involved in vermicompost

41. Business Management

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	MBA 101	Management And Organisational Behaviour	2018	<p>Examine the Management concepts and functions.</p> <p>Apply the concepts of planning, decision making.</p> <p>Apply the concepts of delegation of authority, decentralisation and departmentation in real life situations.</p> <p>Analyse the controlling principles and practices, Ethics and corporate social responsibility.</p> <p>Evaluate the basic concepts of organizational conflicts and climate.</p>
2	MBA 102	Managerial Communications	2018	Apply the basic concepts of communication for business correspondence.

				<p>Distinguish different forms of communication. Evaluate different types of communication. Adapt report writing skills of different types on need basis. Acquire presentation skills along with the interview techniques.</p>
3	MBA 103	Managerial Economics	2018	<p>Describe the importance of managerial economics and its contribution to decision making in different types of business organizations by the managerial economist. Apply the basic principles of managerial economics. Apply demand analysis concept in the real life business situations. Discuss the meaning and usefulness of the production function and cost function in analysing the firm's production activity.</p>
4	MBA 104	Accounting For Managers	2018	<p>Outline the basic knowledge of accounting, bookkeeping, accounting Principles, accounting cycle. Apply the concepts of journal, ledger and Trail balance. Identify the nature of expenditure and revenue for preparation of financial statements of business. Examine the role of accounting policies like depreciation.</p>
5	MBA 105	Quantitative Analysis For Management Decisions	2018	<p>Recall the fundamentals in Mathematics and Statistics. Demonstrate the methods to solve derivatives, progressions and gaming. Choose decision making in a competitive</p>

				<p>situation.</p> <p>Solve transportation Problem with minimum cost of transport of commodities.</p>
6	MBA 106	Information Technology For Managerial Applications	2018	<p>Identify various network topologies.</p> <p>Apply Various Mathematical & Statistical Operations Using MS office &MS-Excel.</p> <p>Create Effective basic power point Presentations</p>
7	MBA 107	Business Statistics	2018	<p>About the information needs, sources of data and measures of central tendency .</p> <p>The concept of Scientific Research and the methods of conducting Scientific Enquiry.</p> <p>The Statistical Tools of Data Analysis.</p>
8	MBA 108	Human Values And Professional Ethics	2018	<p>About ethics, values and morals.</p> <p>The concepts of value based education and its relevance.</p> <p>Learn about environmental and social ethics</p>
9	MBA 201	Marketing Management	2018	<p>Outline the concepts of marketing.</p> <p>Create the segmentation, targeting and positioning in marketing.</p> <p>Analyse various phases of product life cycle.</p> <p>Evaluate various methods of pricing and identify the best pricing strategy.</p> <p>Evaluate marketing communication strategies.</p>
10	MBA 202	Financial Management	2018	<p>Outline the basic concepts of Financial Management.</p> <p>Comprehend the various methods of Investment Analysis and apply various techniques of capital budgeting.</p> <p>Adapt the concepts of leverage, capital structure and its effect on the long term survival of the firm.</p> <p>Appraise various methods of computation of</p>

				cost of capital.
11	MBA 203	Human Resources Management	2018	<p>Outline the functions and challenges of HRM. Apply different concepts of HR Planning, Recruitment, Selection, Training, Interviewing Techniques and Executive Development Programs.</p> <p>:Apply the uses of job analysis, job description, job specification, ergonomics in industry and the methods of job evaluation.</p> <p>Utilize the various methods of performance appraisal.</p>
12	MBA 204	Production Management	2018	<p>Apply the basic concepts of production and operations management and identify types of manufacturing processes.</p> <p>Define and explain concept of production planning and control.</p> <p>Identify effective plant location and plant layout.</p> <p>Design strategies to improve productivity.</p>
13	MBA 205	Business Research Methods	2018	<p>Adapt the fundamentals of Business research methodology.</p> <p>Identify research problem.</p> <p>Apply sample and census survey and measuring techniques.</p> <p>Design data collection techniques.</p> <p>Develop data processing procedures and apply tools.</p> <p>Draft thesis/report writing.</p>
14	MBA 206	Management Information Systems	2018	<p>Understand various types of information systems.</p> <p>Analyse the various functional information systems</p>
15	MBA 207	Operation Research	2018	Understand various concepts and techniques of

				OR. Apply various OR techniques to improve the efficiency of the organisations.
16	MBA 208	Leadership Values	2018	Identify the leadership qualities to run an organization successfully. Appraise the various concepts of value based leadership.
17	MBA 301	Business Environment	2018	Outline the basic concepts of business environment and its components. Analyze the structure of Indian economy. Discuss the components of fiscal policy and balance of payments. Evaluate different trade related policies.
19	MBA 302	Entrepreneurship	2018	Understand the concept of entrepreneurship. Analyse entrepreneurship development programs in India and contents for training forentrepreneurial competencies. Develop Creativity in entrepreneurship. Design the project reports & make project evaluation
20	MBA 311	Consumer Behaviour	2018	Evaluate the consumer behaviour and business strategies. Apply the various consumer behaviour models. Build the psychological process and develop the effective strategy in terms of impact on consumer behaviour.
21	MBA 312	Customer Relationship Management	2018	Develop the concepts of CRM and strategies in business. Appraise the customer profile and perception of customer behavior in relationship perspectives. Analyse strategies for customer acquisition, models of CRM.

22	MBA 313	Marketing Research And Information Systems	2018	<p>Understand basic concepts of research and methodology of conducting researches in marketing domain.</p> <ul style="list-style-type: none"> • Pursue the summer training/ project work and a winter project work and a professional career in Marketing Research domain.
23	MBA 314	Advertising And Sales Promotion Management	2018	<p>Discuss the basic concepts of advertising for better understanding the challenges and opportunities in advertising .</p> <p>Analyse the relations of advertising with segmentation and budget decision .</p> <p>Design better advertising strategies for the company .</p> <p>Identify media options which are suitable for the company for better promotion .</p> <p>Develop an effective advertising campaign for the company .</p>
24	MBA 315	Product And Brand Management	2018	<p>Discuss the importance of brand image in marketing .</p> <p>Formulate brand vision which communicates better the organisations' policy on Branding .</p> <p>Analyse brand promotion methods in brand communication .</p> <p>Analyse factors influencing brand extension decisions .</p> <p>Design brand marketing programmes and for better brand performance .</p>
25	MBA 316	Digital Marketing	2018	<p>Get knowledge regarding basic concepts of Digital Marketing.</p> <p>Analyse and Choose different channels of digital marketing according to the changing requirements of the markets</p> <p>Construct different digital marketing plans on</p>

				<p>situational basis.</p> <p>Manage digital by conducting a marketing research and adapt the changes by creating new goals for further reputation.</p>
26	MBA 321	Financial Services	2018	<p>Have awareness on insurance industry & its regulations.</p> <p>Create awareness on different financial services.</p>
27	MBA 322	Investment Management	2018	<p>Analyse various investment alternatives for effective investment decision .</p> <p>Discuss the importance of security analysis in investment decision process .</p> <p>Design bond management strategies to realise good return on bond investment .</p> <p>Apply different equity valuation methods for the valuation of securities .</p> <p>Construct optimal portfolio for higher return at lower risk .</p> <p>Analyse different schemes of mutual funds for better investment decision .</p>
28	MBA 323	Business Taxation	2018	<p>Conclude the fundamentals of Taxation .</p> <p>Discuss taxation methods of companies and individuals .</p> <p>Analyse income sources from business through taxation .</p> <p>Evaluate Tax management strategies</p>
29	MBA 402	Strategic Management	2018	<p>Develop vision, mission and objectives of the organization.</p> <p>Analyse industry and develop techniques of competitive analysis.</p> <p>Appraise strategic leadership styles and actions.</p> <p>Formulate effective strategies in business.</p> <p>Develop a frame work for the implementation strategies in business.</p>

				Evaluate the strategy controls by measuring performance of organization.
30	MBA 403	Business Laws And Ethics	2018	Analyze the Indian Contract Act. Evaluate Sales of Goods Act and the machinery for redressal of consumer grievances. Elaborate rights and duties of agent and principal, Principal's liability for the acts of agent and the procedure for termination of agency. Examine the rights and duties of partners, dissolution of partnership firm.

46. Computer Science

Master of Computer Applications (MCA)

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MCA 101	Discrete Mathematical Structures	2018	<ol style="list-style-type: none"> 1. The students become familiar with the Sampling Distributions like with replacement and without replacement 2. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it. 3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution
2	MCA 102	Object Oriented Programming with Java	2018	<ol style="list-style-type: none"> 1. Solve and Implement solution for the problem using java basic elements like

				<p>variables, control structures.</p> <ol style="list-style-type: none"> 2. Handle Object Oriented Concepts effectively in the real time problems. 3. Understand the architecture and working procedure of platform independent language JAVA SDK.
3	MCA 103	Computer Organization	2018	<ol style="list-style-type: none"> 1. To gain knowledge about the Micro Processors. 2. To study the hierarchical memory system including cache memories and virtual memory.
4	MCA 104	Operating Systems	2018	<ol style="list-style-type: none"> 1. Learn evaluation of different types Operating System and their functionalities. 2. Learn Internal structure and the function procedure of Operating system in detail.
5	MCA 105	105A.Accounting and Financial management 105B.Accounting Essentials for Computer Applications	2018	<ol style="list-style-type: none"> 1. Use of Accounting information to managers with in the organization. 2. Informs the business decision & control the Management Functions.
6.	MCA 106 P	Software Lab I (based on 101 & 103)	2018	<ol style="list-style-type: none"> 1. The students become familiar with the Sampling Distributions like with replacement and without replacement 2. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it. 3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution. 4. To gain knowledge about the Micro

				Processors. 5. To study the hierarchical memory system including cache memories and virtual memory
7.	MCA 107 P	Object Oriented Programming Lab	2018	<ol style="list-style-type: none"> 1. Solve and Implement solution for the problem using java basic elements like variables, control structures. 2. Handle Object Oriented Concepts effectively in the real time problems. 3. Understand the architecture and working procedure of platform independent language JAVA SDK.
8.	MCA 108P	Operating Systems Lab	2018	<ol style="list-style-type: none"> 1. Learn evaluation of different types Operating System and their functionalities. 2. Learn Internal structure and the function procedure of Operating system in detail.
9.	MCA 201	Computer Oriented Operations Research	2018	<ol style="list-style-type: none"> 1. solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities. 2. formulate and solve problems as networks and graphs and set up decision models and use some solution methods for nonlinear optimization problems. 3. analyse the general nonlinear programming problems. 4. formulate the nonlinear programming models.
10.	MCA 202	Data Structures using Java	2018	<ol style="list-style-type: none"> 1. Develop a program a structured Programming Using JAVA. 2. Develop a Memory Handling work & Sequential Data file handling.

				3. Maintain data using proper data organizing structures.
11	MCA 203	Data Communication and Computer Networks	2018	<ol style="list-style-type: none"> 1. Understand the Network Terminologies and the components used to build networks. 2. Understand Network Models (Topologies) to establish networked systems. 3. Understand the internal architecture, working procedure of OSI Layer and Protocols.
12	MCA 204	Advanced Database Management Systems	2018	<ol style="list-style-type: none"> 1. Students will get an attempt to provide with the advanced information about ADBMS and their development. 2. This Subject also provides the conceptual background necessary to design and develop distributed database System for real life applications and also helps to learn Query optimization, centralized query optimization, Distributed query optimization algorithms. 3. How SQL Programs are implemented as a series of primitive operations and how DDBs are implemented and how applications are design for those DDB
13	MCA 205	205A. E-Commerce	2018	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems. 3. Understand the processes of developing and implementing information systems and be aware of the ethical, social, and

				security issues of information systems;
14		205B. Cyber Security	2018	<ol style="list-style-type: none"> 1. Analyze and evaluate the cyber security needs of an organization and determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation. 2. Measure the performance and troubleshoot cyber security systems and implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools. 3. Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators, Design and develop a security architecture for an organization and design operational and strategic cyber security strategies and policies.
15		205C. Neural Networks	2018	<ol style="list-style-type: none"> 1. Define what is Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network. 2. Analyze ANN learning, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning and Boltzmann learning. 3. Implement Simple perception, Perception learning algorithm, Modified Perception learning algorithm, and Adaptive linear combiner, Continuous perception, learning in continuous perception.
16	MCA 301	Software Engineering	2018	<ol style="list-style-type: none"> 1. Develop a system in a systematic way by

				<p>using various Prescriptive Process models like Waterfall and SDLC.</p> <ol style="list-style-type: none"> 2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements. 3. Analyze and translate a specification into a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse
17	MCA 302	Computer Graphics	2018	<ol style="list-style-type: none"> 1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics. 2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis and Use of geometric transformations on graphics objects and their application in composite form. 3. Extract scene with different clipping methods and its transformation to graphics display device, Explore projections and visible surface detection techniques for display of 3D scene on 2D screen and Render projected objects to naturalize the scene in 2D view and use of illumination

				models for this.
18	MCA 303	Web Technologies	2018	<ol style="list-style-type: none"> 1. Explain the history of the internet and related internet concepts that are vital in understanding web development. 2. Discuss the insights of internet programming and implement complete application over the web and students can Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet. 3. Utilize the concepts of JavaScript and Java, Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.
19	MCA 304	304A.Data warehousing and Data mining	2018	<ol style="list-style-type: none"> 1. To identify the scope and essentiality of Data Warehousing and Mining and to analyze data, choose relevant models and algorithms for respective applications. 2. To study spatial and web data mining. 3. Students develop research interest towards advances in data mining.
20		304B.Big Data Analytics	2018	<ol style="list-style-type: none"> 1. Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. 2. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. 3. Students Interpret business models and scientific computing paradigms, and apply

				software tools for big data analytics and achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications
21		304C System Programming	2018	<ol style="list-style-type: none"> 1. Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems). 2. Ability to use theoretical and applied information in these areas to design system software with realistic constraints. 3. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language programming and Unix shell programming.
22	MCA 305	305A. Cryptography and Network Security	2018	<ol style="list-style-type: none"> 1. Provide security of the data over the network and do research in the emerging areas of cryptography and network security. 2. Implement various networking protocols. 3. Protect any network from the threats in the world
23		305B.Artificial Intelligence	2018	<ol style="list-style-type: none"> 1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations and Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning. 2. Demonstrate awareness and a

				<p>fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.</p> <p>3. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool, Demonstrate proficiency in applying scientific method to models of machine learning and Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.</p>
24		305C.Mobile Application Development	2018	<ol style="list-style-type: none"> 1. Identify various concepts of mobile programming that make it unique from programming for other platforms, Critique mobile applications on their design pros and cons. 2. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, 3. Program mobile applications for the Android operating system that use basic and advanced phone features, and deploy applications to the Android marketplace for distribution.
25	MCA 401	401A.Cloud Computing	2018	<ol style="list-style-type: none"> 1. Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. 2. Apply fundamental concepts in cloud

				<p>infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient.</p> <ol style="list-style-type: none"> 3. Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model. 4. Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS.
26		401B. Dot Net Technologies	2018	<ol style="list-style-type: none"> 1. To explore .NET technologies for designing and developing dynamic, interactive and responsive web applications. 2. Provide a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but webdistributed, or executed remotely. 3. Make the developer experience consistent across widely varying types of apps, such as Windowsbased apps and Web-based apps.
27		401C. Software Testing	2018	<ol style="list-style-type: none"> 1. List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects. 2. Distinguish characteristics of structural testing methods and demonstrate the

				<p>integration testing which aims to uncover interaction and compatibility problems as early as possible.</p> <ol style="list-style-type: none"> Discuss about the functional and system testing methods and demonstrate various issues for object oriented testing.
28	MCA 402	402A. Essentials of Data Science	2018	<ol style="list-style-type: none"> Having a clear understanding of the subject related concepts and contemporary issues. Having problem-solving ability- to assess social issues and engineering problems. Having a clear understanding of professional and ethical responsibility. Having cross-cultural competency exhibited by working as a member or in teams. And having a good working knowledge of communicating in English – communication with the engineering community and society
29		402B.Deep Learning	2018	<ol style="list-style-type: none"> Understand the role of deep learning in machine learning applications and get familiar with the use of TensorFlow/Keras in deep learning applications. Compare Various deep learning Algorithms used for Classification Segmentation and detection. Apply various concepts related with Deep Learning to solve Problems. Analyse different deep learning models in Image related projects.
30		402C.Internet of Things	2018	<ol style="list-style-type: none"> Able to understand the application areas of IOT.

				<ol style="list-style-type: none"> 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. 3. Able to understand building blocks of Internet of Things and characteristics.
31	MCA 403	Major Project Work	2018	

M.Sc (CS) : Master of Computer Science

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MSCS -101C	Computer Organization	2018	<ol style="list-style-type: none"> 1. To gain knowledge about the Micro Processors. 2. To study the hierarchical memory system including cache memories and virtual memory.
2	MSCS -102C	Programming in Java & Data Structures	2018	<ol style="list-style-type: none"> 1. Develop a program a structured Programming Using JAVA. 2. Develop a Memory Handling work & Sequential Data file handling. 3. Maintain data using proper data organizing structures.
3	MSCS -103C	Operating Systems	2018	<ol style="list-style-type: none"> 1. Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,. 2. Analyze important algorithms eg. Process scheduling and memory management algorithms. 3. Categorize the operating system's resource management techniques, dead

				lock management techniques, memory management techniques. 4. Demonstrate the ability to perform OS tasks in Red Hat Linux Enterprise.
4	MSCS –104 GE – A	Mathematical FoundationsFor ComputerScience	2018	<ol style="list-style-type: none"> 1. Ability to apply mathematical logic to solve problems. 2. Understand sets, relations, functions, and discrete structures. 3. Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions. 4. Able to formulate problems and solve recurrence relations. 5. Able to model and solve real-world problems using graphs and trees.
5	MSCS –104 GE - B	ComputerOrientedOperationalResearch	2018	<ol style="list-style-type: none"> 1. Solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities. 2. Formulate and solve problems as networks and graphs and set up decision models and use some solution methods for nonlinear optimization problems. 3. Analyse the general nonlinear programming problems. 4. Formulate the nonlinear programming models.
6	MSCS -05CF	Environmental Studies	2018	<ol style="list-style-type: none"> 1. Articulate the interconnected and interdisciplinary nature of environmental studies. 2. Demonstrate an integrative approach to environmental issues with a focus on

				<p>sustainability.</p> <ol style="list-style-type: none"> 3. Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences, and humanities in environmental problem solving. 4. Communicate complex environmental information to both technical and non-technical audiences. 5. Understand and evaluate the global scale of environmental problems and reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.
7	MSCS -106EF	1. A. PC HardwareBasics	2018	<ol style="list-style-type: none"> 2. Identify the hardware components of a computer. Lists the hardware components such as processor, memory, disk, main board, etc. 3. Explains the features of the hardware components of a computer. Explains the relationships between the components of a computer and how data are transferred among the components. 4. identify the peripheral devices outside computer. Uses computer using input devices, such as keyboard and mouse. 5. Transfers data outside the computer using output devices, such as screen and printer. Saves files to removable devices and loads files from removable devices. 6. Connects to the Internet using network cards. identify the software's running on

				a computer. Identifies BIOS and changes settings in BIOS.
8	MSCS -106EF	B. Statistical Methods	2018	<ol style="list-style-type: none"> 1. Calculate and interpret the correlation between two variables. Calculate the simple linear regression equation for a set of data. 2. Employee the principles of linear regression and correlation, including least square method, predicting a particular value of Y for a given value of X and significance of the correlation coefficient. 3. Know the association between the attributes. Know the construction of point and interval estimators. 4. Evaluate the properties of estimators. Demonstrate understanding of the theory of maximum likelihood estimation.
9	MSCS -201C	AdvancedDataBase ManagementSystem	2018	<ol style="list-style-type: none"> 1. Explain and evaluate the fundamental theories for advanced database architectures and query operators. 2. Design and implement parallel database systems with evaluating different methods of storing, managing of parallel database. 3. Assess and apply database functions of distributed database. Evaluate different database designs and architecture. 4. Administer and analyze database with query optimization techniques and developWeb interface with database. 5. Understand advanced querying and decision support system.
10	MSCS -202C	ComputerNetworks	2018	<ol style="list-style-type: none"> 1. Describe the general principles of data

				<p>communication. Describe how computer networks are organized with the concept of layered approach.</p> <ol style="list-style-type: none"> Describe how signals are used to transfer data between nodes. Implement a simple LAN with hubs, bridges and switches. Describe how packets in the Internet are delivered. Analyze the contents in a given data link layer packet, based on the layer concept. Design logical sub-address blocks with a given address block. Decide routing entries given a simple example of network topology. Describe what classless addressing scheme and how routing protocols work.
11	MSCS -203C	ComputerGraphics	2018	<ol style="list-style-type: none"> The course introduces the basic concepts of computer graphics. It provides the necessary theoretical background and demonstrates the application of computer science to graphics. The course further allows students to develop programming skills in computer graphics through programming assignments. Understands the core concepts and mathematical foundations of computer graphics knows fundamental computer graphics algorithms and data structures. Has an overview of different modeling approaches and methods and has detailed knowledge about basic shading and texture mapping techniques.

				4. Understands light interaction with 3D scenes.
12	MSCS-204 GE – A	E-Commerce	2018	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems. Understand the processes of developing and implementing information systems. 3. Be aware of the ethical, social, and security issues of information systems;
13	MSCS-204 GE B	AccountingAndFinancialManagement	2018	<ol style="list-style-type: none"> 1. Use of Accounting information to managers within the organization. 2. Informs the business decision & control the Management Functions.
14	MSCS-205CF	HumanRightsAnd ValueEducation	2018	<ol style="list-style-type: none"> 1. understand the historical growth of the idea of human rights. 2. demonstrate an awareness of the international context of human rights. 3. demonstrate an awareness of the position of human rights in the UK prior to 1998. 4. understand the importance of the Human Rights Act 1998, analyse and evaluate concepts and ideas.
15	MSCS-206 EF A	PrinciplesOf Management	2018	<ol style="list-style-type: none"> 1. Understand the concepts related to Business. 2. Demonstrate the roles, skills and functions of management. 3. Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions. 4. Understand the complexities associated

				with management of human resources in the organizations and integrate the learning in handling these complexities.
16	MSCS-206 EF B	InternetOfThings	2018	<ol style="list-style-type: none"> 1. Able to understand the application areas of IOT. 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. 3. Able to understand building blocks of Internet of Things and characteristics.
17	MSCS-301C	DataWarehousing and Data Mining	2018	<ol style="list-style-type: none"> 1. Understand the functionality of the various data mining and data warehousing component. 2. Appreciate the strengths and limitations of various data mining and data warehousing models. 3. Explain the analyzing techniques of various data. 4. Describe different methodologies used in data mining and data ware housing. 5. Compare different approaches of data ware housing and data mining with various technologies.
18	MSCS-302C	WebTechnologies	2018	<ol style="list-style-type: none"> 1. Analyze a web page and identify its elements and attributes. 2. Create web pages using XHTML and Cascading Style Sheets. 3. Build dynamic web pages using JavaScript (Client side programming). Create XML documents and Schemas. 4. Build interactive web applications using AJAX.
19	MSCS-303C	Software Engineering	2018	<ol style="list-style-type: none"> 1. Develop a system in a systematic way by

				<p>using various Prescriptive Process models like Waterfall and SDLC.</p> <ol style="list-style-type: none"> 2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements. 3. Analyze and translate a specification into a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse 	
20	MSCS GE-A	-304-	SystemsProgramming	2018	<ol style="list-style-type: none"> 1. Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems). 2. Ability to use theoretical and applied information in these areas to design system software with realistic constraints. 3. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language programming and Unix shell programming. 4. Ability to devise, select, and use modern techniques and tools needed for the

				design and implementation of system programs.	
21	MSCS GE-B	-304-	ComputerAlgorithms	2018	<ol style="list-style-type: none"> 1. Apply design principles and concepts to algorithm design (c) 2. Have the mathematical foundation in analysis of algorithms (a, j) 3. Understand different algorithmic design strategies (j) 4. Analyze the efficiency of algorithms using time and space complexity theory (b)
22	MSCS GE-C	-304-	UIDUsing.NetTechnologies	2018	<ol style="list-style-type: none"> 1. Provide a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but web distributed, or executed remotely. 2. Build all communication on industry standards to ensure that code based on .NET Framework integrates with any other code. 3. Building multi-tier enterprise applications. 4. Client-side programming: HTTP, CGI, Cookies, JavaScript, HTML, XML.
23	MSCS GE-D	-304-	IT inForensicScience	2018	<ol style="list-style-type: none"> 1. Approach analysis of evidence without bias. 2. Develop a conceptual understanding of criminal justice system, rules of evidence, legal system. 3. develop professional, ethical graduates whose competence in problem-solving, legal analysis and application, quantitative reasoning, investigation and

				scientific laboratory procedures can be applied to immediate employment or advanced study.	
24	MSCS GE-E	-304-	SoftwareTesting	2018	<ol style="list-style-type: none"> 1. Various test processes and continuous quality improvement, Types of errors and fault models. 2. Methods of test generation from requirements. 3. Behavior modeling using UML: Finite state machines (FSM), Test generation from FSM models, Input space modeling using combinatorial designs. 4. Combinatorial test generation, Test adequacy assessment using: control flow, data flow, and program mutations, The use of various test tools. 5. Application of software testing techniques in commercial environments.
25	MSCS GE-A	-305	Cloud Computing	2018	<ol style="list-style-type: none"> 1. Understand the concepts, characteristics, delivery models and benefits of cloud computing 2. Understand the key security and compliance challenges of cloud computing 3. Understand the key technical and organisational challenges 4. Understand the different characteristics of public, private and hybrid cloud deployment models.
26	MSCS GE-B	-305	BigDataAnalytics	2018	<ol style="list-style-type: none"> 1. Understand Big Data and its analytics in the real world, Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to

				<p>generate analytics.</p> <ol style="list-style-type: none"> 2. Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm, Design and Implementation of Big Data Analytics using pig and spark to solve data intensive problems and to generate analytics. 3. Implement Big Data Activities using Hive.
27	MSCS -305 GE-C	ArtificialNeuralNetworks	2018	<ol style="list-style-type: none"> 1. Know the main provisions neuro mathematics, Know the main types of neural networks; 2. Know and apply the methods of training neural networks; 3. Know the application of artificial neural networks; 4. To be able to formalize the problem, to solve it by using a neural network.
28	MSCS -305 GE-D	Cyber Security	2018	<ol style="list-style-type: none"> 1. Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure. 2. Design, develop, test and evaluate secure software. 3. Develop policies and procedures to manage enterprise security risks. 4. Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training. 5. Interpret and forensically investigate security incidents.
29	MSCS -305 GE-E	Mobile AppDevelopment	2018	<ol style="list-style-type: none"> 1. Describe those aspects of mobile programming that make it unique from

				programming for other platforms, 2. Critique mobile applications on their design pros and cons, 3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, 4. Program mobile applications for the Android operating system that use basic and advanced phone features, and 5. Deploy applications to the Android marketplace for distribution.
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47. Commerce

M.Com (Regular)

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Accounting Standards & Reporting	2018	i. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation ii. Impart the ability to find out the cash flows and provide the skills to value goodwill iii. Create awareness about IFRS and segment reporting
2	102.	Financial Management	2018	i. Describe meaning, functions and objectives; role of financial manager. ii. Examine investment decision, capital budgeting, techniques of CB and methods of CB. iii. Investigate management of working capital, needs and concepts.

				<ul style="list-style-type: none"> iv. Asses financing decision, capital structure and capital theories. v. Design dividend decision and theories of dividend.
3	103.	Business Environment and Policy	2018	<ul style="list-style-type: none"> i. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment. ii. Illustrates economic environment nature and scope and new economic policy. iii. Develop political, legal environment; reasons for state intervention and government business interface. iv. Study the socio cultural environment nature, impact of social responsibility and business ethics. v. Interpret global environment; benefits and problems of MNCs and WTO.
4	104.	Organisational Behaviour	2018	<ul style="list-style-type: none"> i. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation ii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts. iii. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.
5	105a	Quantitative Techniques for Business Decisions	2018	<ul style="list-style-type: none"> i. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions. ii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions. iii. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.

7	201	Advanced cost Accounting	2018	<ul style="list-style-type: none"> i. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting; ii. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits. iii. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets. iv. Perceive the significance of ABC in cost ascertainment and control.
8	202.	Financial Markets and Services	2018	<ul style="list-style-type: none"> i. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market. ii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market. iii. Create plans and understand the metrics for getting finance from venture capital firms.
9	203.	Strategic Financial Management	2018	<ul style="list-style-type: none"> i. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics, ii. Explain Strategic financial management success factors and constraints. iii. Illustrate corporate valuation approaches and guidelines; value based management. iv. Identify financial distress and restructuring; countering financial distress. v. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.
10	204.	Corporate Governance	2018	<ul style="list-style-type: none"> i. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices. ii. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India. iii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.

				<p>iv. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205a	Working Capital Management	2018	<p>i. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>ii. To enable the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>iii. To provide the skills of inventory management with different techniques.</p>
12	206a	e-Banking Operations	2018	<p>i. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>ii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>iii. Categorize the financial frauds in e-banking sector.</p>
13	301	Security Analysis and Portfolio Management	2018	<p>i. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models.</p> <p>ii. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index.</p> <p>iii. Synthesize portfolio revision, need and strategies.</p>
14	302.	Accounting for Managerial Decisions	2018	<p>i. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing.</p> <p>ii. Study the concept of Responsibility Accounting and its uses and trends.</p> <p>iii. Know the essential parameters for evaluation of divisional performance and the</p>

				<p>emerging issues today</p> <p>iv. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.</p>
15	303a	Tally with GST Application	2018	<p>i. To acquaint oneself with skills to prepare financial statements through Tally ERP.</p> <p>ii. To understand basics of GST system and to know steps involved in generating GSTR reports.</p> <p>iii. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.</p>
16	303c	Tax planning & Management	2018	<p>i. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads</p> <p>ii. Acquire the knowledge on tax planning with regard to location</p> <p>iii. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.</p>
18	305a	Fundamentals of Accounting	2018	<p>i. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts</p> <p>ii. To help the students to acquire the skills of financial statement analysis</p> <p>iii. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.</p>
19	401	Financial Derivatives	2018	<p>i. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions.</p> <p>ii. Prioritise options in financial derivatives and option pricing models.</p> <p>iii. Compose swap market futures, types and interest rate; pricing swaps.</p> <p>iv. Synthesize stock index futures, options and trading of stock futures and options.</p>
20	402.	Project Planning	2018	<p>i. Define a project and operations of corporate long range planning and phases of</p>

		& Control		<p>capital budgeting.</p> <p>ii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>iii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>iv. Understand Social cost benefit analysis and methods of SCBA</p> <p>v. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403a	Insurance Management	2018	<p>i. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>ii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>iii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon.</p> <p>iv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>v. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
23	405a	Security Market Operations	2018	<p>i. Learn the basic concepts of Indian securities market.</p> <p>ii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>iii. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Accounting Standards & Reporting	2018	<ul style="list-style-type: none"> iv. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation v. Impart the ability to find out the cash flows and provide the skills to value goodwill vi. Create awareness about IFRS and segment reporting
2	102.	Financial Management	2018	<ul style="list-style-type: none"> vi. Describe meaning, functions and objectives; role of financial manager. vii. Examine investment decision, capital budgeting, techniques of CB and methods of CB. viii. Investigate management of working capital, needs and concepts. ix. Asses financing decision, capital structure and capital theories. x. Design dividend decision and theories of dividend.
3	103.	Business Environment and Policy	2018	<ul style="list-style-type: none"> vi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment. vii. Illustrates economic environment nature and scope and new economic policy. viii. Develop political, legal environment; reasons for state intervention and government business interface. ix. Study the socio cultural environment nature, impact of social responsibility and business ethics. x. Interpret global environment; benefits and problems of MNCs and WTO.
4	104.	Organisational Behaviour	2018	<ul style="list-style-type: none"> iv. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation v. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of interpersonal conflicts.

				<ul style="list-style-type: none"> vi. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.
5	105a	Quantitative Techniques for Business Decisions	2018	<ul style="list-style-type: none"> iv. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions. v. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions. vi. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.
7	201	Advanced cost Accounting	2018	<ul style="list-style-type: none"> v. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting; vi. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits. vii. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets. viii. Perceive the significance of ABC in cost ascertainment and control.
8	202.	Financial Markets and Services	2018	<ul style="list-style-type: none"> iv. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market. v. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market. vi. Create plans and understand the metrics for getting finance from venture capital firms.
9	203.	Strategic	2018	<ul style="list-style-type: none"> vi. Describe strategic management concept, importance and purpose; strategic

		Financial Management		<p>planning concept and characteristics,</p> <p>vii. Explain Strategic financial management success factors and constraints.</p> <p>viii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>ix. Identify financial distress and restructuring; countering financial distress.</p> <p>x. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2018	<p>v. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>vi. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>vii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>viii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205a	Working Capital Management	2018	<p>iv. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>v. To enables the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>vi. To provide the skills of inventory management with different techniques.</p>
12	206a	e-Banking Operations	2018	<p>iv. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>v. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>vi. Categorize the financial frauds in e-banking sector.</p>

13	301	Security Analysis and Portfolio Management	2018	<ul style="list-style-type: none"> iv. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models. v. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; sharpe's, treynor's and Jensen's performance index. vi. Synthesize portfolio revision, need and strategies.
14	302.	Accounting for Managerial Decisions	2018	<ul style="list-style-type: none"> v. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing. vi. Study the concept of Responsibility Accounting and its uses and trends. vii. Know the essential parameters for evaluation of divisional performance and the emerging issues today viii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.
15	303a .	Tally with GST Application	2018	<ul style="list-style-type: none"> iv. To acquaint oneself with skills to prepare financial statements through Tally ERP. v. To understand basics of GST system and to know steps involved in generating GSTR reports. vi. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.
16	303c .	Tax planning & Management	2018	<ul style="list-style-type: none"> iv. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads v. Acquire the knowledge on tax planning with regard to location vi. To provide the skills of tax planning regard to managerial decisions and create

				awareness about tax incentive of exports.
18	305a	Fundamentals of Accounting	2018	<ul style="list-style-type: none"> iv. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts v. To help the students to acquire the skills of financial statement analysis vi. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.
19	401	Financial Derivatives	2018	<ul style="list-style-type: none"> v. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions. vi. Prioritise options in financial derivatives and option pricing models. vii. Compose swap market futures, types and interest rate; pricing swaps. viii. Synthesize stock index futures, options and trading of stock futures and options.
20	402.	Project Planning & Control	2018	<ul style="list-style-type: none"> vi. Define a project and operations of corporate long range planning and phases of capital budgeting. vii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting. viii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project. ix. Understand Social cost benefit analysis and methods of SCBA x. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.
21	403a	Insurance Management	2018	<ul style="list-style-type: none"> vi. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector. vii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance. viii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon. ix. Seek awareness on miscellaneous insurance including health, personal

				<p>accident crop insurance and practical problems in implementation and claim settlement.</p> <p>x. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
23	405a	Security Market Operations	2018	<p>iv. Learn the basic concepts of Indian securities market.</p> <p>v. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>vi. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>

M.Com (FM)

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Accounting Standards & Reporting	2018	<p>vii. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation</p> <p>viii. Impart the ability to find out the cash flows and provide the skills to value goodwill</p> <p>ix. Create awareness about IFRS and segment reporting</p>
2	102.	Financial Management	2018	<p>xi. Describe meaning, functions and objectives; role of financial manager.</p> <p>xii. Examine investment decision, capital budgeting, techniques of CB and methods of CB.</p> <p>xiii. Investigate management of working capital, needs and concepts.</p> <p>xiv. Asses financing decision, capital structure and capital theories.</p> <p>xv. Design dividend decision and theories of dividend.</p>

3	103.	Business Environment and Policy	2018	<p>xi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment.</p> <p>xii. Illustrates economic environment nature and scope and new economic policy.</p> <p>xiii. Develop political, legal environment; reasons for state intervention and government business interface.</p> <p>xiv. Study the socio cultural environment nature, impact of social responsibility and business ethics.</p> <p>xv. Interpret global environment; benefits and problems of MNCs and WTO.</p>
4	104.	Organisational Behaviour	2018	<p>vii. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation</p> <p>viii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts.</p> <p>ix. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.</p>
5	105a	Quantitative Techniques for Business Decisions	2018	<p>vii. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions.</p> <p>viii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions.</p> <p>ix. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.</p>
7	201	Advanced cost Accounting	2018	<p>ix. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting;</p>

				<p>x. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits.</p> <p>xi. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets.</p> <p>xii. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial Markets and Services	2018	<p>vii. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market.</p> <p>viii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>ix. Create plans and understand the metrics for getting finance from venture capital firms.</p>
9	203.	Strategic Financial Management	2018	<p>xi. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>xii. Explain Strategic financial management success factors and constraints.</p> <p>xiii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>xiv. Identify financial distress and restructuring; countering financial distress.</p> <p>xv. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2018	<p>ix. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>x. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>xi. Discern knowledge on the composition of Board of Directors and Audit</p>

				<p>Committees and know the role of internal Auditors in India.</p> <p>xii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205a	Working Capital Management	2018	<p>vii. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>viii. To enable the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>ix. To provide the skills of inventory management with different techniques.</p>
12	206a	e-Banking Operations	2018	<p>vii. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>viii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>ix. Categorize the financial frauds in e-banking sector.</p>
13	301	Security Analysis and Portfolio Management	2018	<p>vii. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models.</p> <p>viii. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index.</p> <p>ix. Synthesize portfolio revision, need and strategies.</p>
14	302.	Accounting for Managerial Decisions	2018	<p>ix. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing.</p>

				<p>x. Study the concept of Responsibility Accounting and its uses and trends.</p> <p>xi. Know the essential parameters for evaluation of divisional performance and the emerging issues today</p> <p>xii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.</p>
15	303a	Tally with GST Application	2018	<p>vii. To acquaint oneself with skills to prepare financial statements through Tally ERP.</p> <p>viii. To understand basics of GST system and to know steps involved in generating GSTR reports.</p> <p>ix. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.</p>
16	303c	Tax planning & Management	2018	<p>vii. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads</p> <p>viii. Acquire the knowledge on tax planning with regard to location</p> <p>ix. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.</p>
18	305a	Fundamentals of Accounting	2018	<p>vii. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts</p> <p>viii. To help the students to acquire the skills of financial statement analysis</p> <p>ix. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.</p>
19	401	Financial Derivatives	2018	<p>ix. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions.</p> <p>x. Prioritise options in financial derivatives and option pricing models.</p>

				<p>xi. Compose swap market futures, types and interest rate; pricing swaps.</p> <p>xii. Synthesize stock index futures, options and trading of stock futures and options.</p>
20	402.	Project Planning & Control	2018	<p>xi. Define a project and operations of corporate long range planning and phases of capital budgeting.</p> <p>xii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>xiii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>xiv. Understand Social cost benefit analysis and methods of SCBA</p> <p>xv. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403a	Insurance Management	2018	<p>xi. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>xii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>xiii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon.</p> <p>xiv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>xv. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
23	405a	Security Market Operations	2018	<p>vii. Learn the basic concepts of Indian securities market.</p> <p>viii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>ix. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>

48. B. Pharmacy

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	BPH 101A	Mathematics (For Bi.P.C. Stream)	2018	<ol style="list-style-type: none">1. This program shall create an awareness about the mathematical problems, to develop an statistical evaluation.2. To adopt skills in identifying and solving problems.3. Know the theory and their application in Pharmacy research4. Solve the different types of problems by applying theory in drug discovery
4	BPH 102	English & Soft Skills	2018	<ol style="list-style-type: none">1.To equip students with Pre-presentations and to understand the structure of a good presentation and devise various techniques for delivering a successful presentation. To help students overcome stage fear and take questions.2.To enable the students to become global citizens.

				<p>3.This course will prepare the young pharmacy student to interact effectively with doctors, nurses and other health workers.</p> <p>4.At the end of the course the students will get the soft skills set to work cohesively with the team as a team player and add value to the pharmaceutical business.</p>
5	BPH 103	Pharmaceutical. Inorganic Chemistry	2018	<p>1.To understand the history and concept of pharmacopoeia and its editions.</p> <p>2. Knowledge about the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals.</p> <p>3. Identification of limit tests of different pharmaceutical inorganic compounds.</p> <p>4. To understand the method to prepare inorganic pharmaceuticals.</p> <p>5. To justify the medicinal importance of acidifiers, antacids, cathartics and antimicrobial agents as gastrointestinal agents.</p> <p>6. To discuss the handling and applications of radiopharmaceuticals.</p>
6.	BPH 104	Pharmaceutical Organic Chemistry-I	2018	<p>1.Guess and writethestructure, systematic/ trivial</p>

				<p>name, and pharmaceutical uses (if any) associated with the specified organic compounds.</p> <p>2. Understand the general concept of isomerism and distinguish structural isomers.</p> <p>3. Infer the chemical nature of the compounds on the basis of qualitative chemical tests.</p> <p>4. Understand the significance of certain electronic effects with respect to the reactivity/stability of organic compounds specified.</p> <p>5. Understand and gain insight into the organic reactions by analyzing their fair reaction mechanisms</p>
7.	BPH 105	Human Anatomy and Physiology	2018	<p>1. Know the fundamental knowledge on the structure and functions of the various systems of the human body.</p> <p>2. understanding all the homeostatic mechanisms of the body</p> <p>3. Understand the relationship of anatomy with various disciplines of pharmacy.</p> <p>4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition</p>
8.	BPH 106	Pharmaceutical Inorganic Chemistry Practicals	2018	<p>1. To recall the sources of limit tests, preparation and identification of compounds.</p> <p>2. To demonstrate the preparation of inorganic pharmaceuticals</p>

				<p>3. To apply knowledge to perform modified limit tests.</p> <p>4. To analyze various inorganic pharmaceutical compounds.</p> <p>5. To select suitable method for the preparation of inorganic pharmaceuticals.</p> <p>6. To assess quality of inorganic pharmaceuticals.</p>
9.	BPH 107	Pharmaceutical Organic Chemistry-I Practicals	2018	<p>1. Assess the identity in terms of the physico-chemical properties of the compounds of specified chemical classes</p> <p>2. Get hands- on- experience in basic techniques of organic synthesis</p>
10.	BPH 108	Human Anatomy and Physiology Practicals	2018	<p>1. Differentiate the structures of the various systems of the human body.</p> <p>2. Perform the experiments like blood cell count, hemoglobin content, bleeding and clotting time and various physiological Parameters theoretically and practically.</p> <p>3. Identify the structural (microscopically and macroscopically) and functional details about different organ systems such as cardiovascular, lymphatic, digestive, muscular system</p>
11	BPH 109	General & Dispensing Pharmacy	2018	Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage

				forms on the performance of the drug product
12	BPH 110	Pharmaceutical Organic Chemistry-II	2018	<p>1. Guess and write the structure, systematic/ trivial name, and pharmaceutical uses (if any) associated with the specified organic compounds.</p> <p>2. Understand the general concept of isomerism and distinguish structural isomers.</p> <p>3. Infer the chemical nature of the compounds on the basis of qualitative chemical tests.</p> <p>4. Understand the significance of certain electronic effects with respect to the reactivity/ stability of organic compounds specified.</p> <p>5. Understand and gain insight into the organic reactions by analyzing their fair reaction mechanisms</p>
13	BPH 111	Computer applications	2018	<p>1. know the various types of application of computers in pharmacy profession</p> <p>2. know the various types of databases used in profession</p> <p>3. know the usage of softwares in pharmacy</p>
14	BPH 112	Pharmacognosy I	2018	<p>The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially. Also this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of</p>

				medicine.
15	BPH 113	Human Anatomy and Physiology and Pathophysiology	2018	<p>1. Identifies Name the signs, symptoms and complications of the diseases.</p> <p>2. Students Get thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms.</p> <p>3. To Study the aetiology and pathogenesis of the selected disease states</p> <p>4. The baseline knowledge required to practice medicine safely, confidently, rationally and effectively.</p>
16	BPH 114	General & Dispensing Pharmacy Practicals	2018	This is help to understand the basic information of formulation process and how to optimise quality control solid, semisolid and parenteral dosage forms
17	BPH 115	Pharmaceutical Organic Chemistry-II Practicals	2018	This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class
18	BPH 116	Computer applications Practicals	2018	1. know the various types of application of

				<p>computers in pharmacy profession</p> <p>2. know the various types of databases used in profession</p> <p>3. know the usage of softwares in pharmacy</p>
19	BPH 117	Pharmacognosy I Practicals	2018	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents by use chromatographic technique
20	BPH 201	Physical pharmacy –I (Theory)	2018	<p>1.The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations.</p> <p>2.Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.</p>
21	BPH 202	Pharmaceutical Engineering (Theory)	2018	<p>1. To know various unit operations involved in manufacturing of pharmaceuticals.</p> <p>2. To understand the concepts of flow of fluids, size reduction and size separation.</p> <p>3 To perform different mechanisms of heat transfer.</p> <p>4 To compare and contrast different types of evaporation and distillation process.</p> <p>5 To determine the factors influencing mixing, filtration and centrifugation.</p> <p>6 To elaborate various preventive methods used for corrosion control in pharmaceutical industries.</p>
22	BPH 203	Pharmaceutical organic chemistry III (Theory)	2018	<ul style="list-style-type: none"> • Guess and write the structure according to the stereochemical specifications. • Fairly understand the aspects of

				<p>heterocyclic chemistry in terms of naming and reactivity.</p> <ul style="list-style-type: none"> Assess and understand the pharmaceutical applications and importance of the specified named reactions.
23	BPH 204	Pharmaceutical Biochemistry (Theory)	2018	<p>1.Understand the principles of various fields of chemistry and biology (organic chemistry, analytical chemistry, biochemistry, genetics, metabolism, and molecular biology)</p> <p>2.Develop as independent thinkers who are responsible for their own learning. Develop transferable quantitative skills.</p>
24	BPH 205	Environmental studies (Theory)	2018	<p>This program shall create an awareness about environmental problems, develop an attitude towards of concern for the environment.</p> <p>2 To compare the natural, renewable and non-renewable resources and the problems associated with them.</p> <p>3 To motivate the learners to participate in environment protection and improvement.</p> <p>4 To analyze the concepts of eco system including structure and functions.</p> <p>5 To adopt skills in identifying and solving environmental problems.</p> <p>6 To develop an attitude of concern for the</p>

				environment
25	BPH 206	Physical pharmacy –I (Practical)	2018	This course helps to compare and evaluate the solubility of various combination compound modify for better solubility approaches by use different level of methods
26	BPH 207	Pharmaceutical Engineering (Practical)	2018	<p>To understand the basic principles involved in unit operations such as size reduction, size separation, distillation and drying.</p> <ol style="list-style-type: none"> 2. To demonstrate and explain about the construction, working and applications of pharmaceutical equipment's such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer. 3. To experiment with the process variables of filtration, evaporation and infer the same. 4. To determine radiation constant of brass, iron, unpainted and painted glass. 5. To determine overall heat transfer coefficient by heat exchanger and calculate the efficiency of steam distillation. 6. To estimate moisture content, loss on drying and construct drying curves for calcium carbonate and starch.
27	BPH 208	Pharmaceutical organic chemistry III	2018	1. Guess and writethestructure, systematic/

		(Practical)		<p>trivial name, and pharmaceutical uses (if any) associated with the specified organic compounds.</p> <ol style="list-style-type: none"> Understand the general concept of isomerism and distinguish structural isomers. Infer the chemical nature of the compounds on the basis of qualitative chemical tests. Understand the significance of certain electronic effects with respect to the reactivity/ stability of organic compounds specified. Understand and gain insight into the organic reactions by analyzing their fair reaction mechanisms
28	BPH 209	Pharmaceutical Biochemistry (Practical)	2018	<ol style="list-style-type: none"> Understand the principles of various fields of chemistry and biology (organic chemistry, analytical chemistry, biochemistry, genetics, metabolism, and molecular biology) Develop as independent thinkers who are responsible for their own learning. Develop transferable quantitative skills.
29	BPH 210	Physical Pharmacy II (Theory)	2018	<ol style="list-style-type: none"> The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms

30	BPH 211	Pharmaceutical Analysis I (Theory)	2018	<p>1) To understand selected instrumental analytical techniques (spectroscopic and chromatographic methods) and differentiate with volumetric analysis.</p> <p>To gain knowledge on interaction of EMR with matter and to build the analytical understanding at the level of atom, group and molecular structure of organic and inorganic compounds with different functional groups and their applications in pharmacy.</p> <p>3) To maximize knowledge on characterization and estimation of ions by spectroscopical techniques</p> <p>4) To simplify affinity of matter with stationary phase and mobile phase, physical and chemical.</p>
31	BPH 212	Pharmaceutical Technology I (Theory)	2018	<ol style="list-style-type: none"> 1. basic concepts in the field of drug delivery systems that is used in Pharmaceutical Technology. 2. uses pharmaceutical information sources medical 3. Lists in the form of liquid drug delivery systems. 4. Defines the concepts of dissolution, solubility and stability. 5. Design Solution formulations.
32	BPH 213	Pharmacognosy II (Theory)	2018	<p>This subject is intended to impart students about the fundamental knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially, involved in the study of producing plants and phytochemicals through plant tissue culture, drug interactions and basic</p>

				<p>principles of traditional system of medicine.</p> <ol style="list-style-type: none"> 1. Significance of pharmacognostic parameters & study of crude drugs. 2. Understand the underlying reason of evolutionary significance of secondary metabolites production in plants & other organisms & deduce their significance as medicinal molecules. 3. How these primary metabolites are used comprehensively as a source to develop Pharmaceutical & industrial applications. <p>Study about the source, name, chemical structures, methods of extraction, qualitative & quantitative analysis of glycosides & tannin compounds of plant origin.</p>
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33	BPH 214	Pharmacoinformatics & Basics in drug discovery (Theory)	2018	<ol style="list-style-type: none"> 1. Thorough Knowledge on Bioinformatics and its classification. 2. Importance of drug discovery, lead molecules in the preparation of drugs in pharmaceutical industries. 3. Good information about drug design, ligand – receptor mechanism and its applications. 4. How this subject is collaborate with other disciplinary subjects, Understanding Genomics & transcriptomics.
34	BPH 215	Pharmaceutical pharmacy II (Practical)	2018	This course helps to compare and evaluate the solubility of various combination compound modify

				for better solubility approaches by use different level of methods
35	BPH 216	Pharmaceutical Analysis I (Practical)	2018	<ol style="list-style-type: none"> 1. Discusses the effect of impurities on the quality of drugs and behavioural pattern of drugs 2. Aids in understanding the SOP and usage of software associated with various analytical instruments <p>Helps in gaining knowledge of interpretation of spectra and of chromatograms</p>
36	BPH 217	Pharmaceutical technology I (Practical)	2018	<ol style="list-style-type: none"> 1.Preparing the solutions 2.Preparing the emulsions 3.Preparing the syrups 4.Preparing the semisolid dosage forms
37	BPH 218	Pharmacognosy II (Practical)	2018	<ol style="list-style-type: none"> 1. Demonstrate chemical tests to identify unorganized crude drugs 2. Evaluate the quality and purity of crude drugs 3. Perform linear measurements for crude drug identification <p>Develop quality control methods for standardisation of herbal drugs</p>
38	BPH 301	Pharmaceutical Technology-II	2018	<p>Course enables the student to understand and appreciate the influence of pharmaceutical manufacture of various pharmaceutical dosage forms on the performance of the drug product by use of specific technology</p>

39	BPH 302	Medicinal chemistry - I	2018	<ol style="list-style-type: none"> 1. Gain knowledge on physicochemical and biological aspects of various drug classes. 2. Judge the effect of structural medications with respect to biological activity <p>Develop awareness about the application of organic synthesis with respected preparation of drugs</p>
40	BPH 303	Pharmacology - I	2018	<ol style="list-style-type: none"> 1. Gain knowledge on pharmacokinetic and pharmacodynamic aspects of drugs in general. 2. Develop understanding about physiological, pathological, and pharmacological concepts of nervous system.
41	BPH 304	Pharmaceutical microbiology	2018	<ol style="list-style-type: none"> 1.To know the various types of sterile products with their formulation in large scale industries. 2.To acquire knowledge on GMP standards sanitation, personal hygiene in sterile product manufacturing facilities.
41	BPH 305	Drug store and Industrial Managementand Marketing	2018	<ol style="list-style-type: none"> 1.This course helps to understand the students how to establishthe drug store and functioning the proper channels and also procurement and dispensing of drugs procedure as per government norms. 2. Gain knowledge on functioning and management of pharma industry and know the regulating process in all aspects
42	BPH 306	Pharmaceutical Technology-II	2018	This course helps to Identify, formulate, research on pharmaceutical solid and parenteral dosage form and solve complex problems in quality control of product
43	BPH 307	Medicinal chemistry-I practicals	2018	This course helps to how to separation and identification compound given unknown mixture. It imparts take it knowledge on crude separation and identification technique
44	BPH 308	Pharmaceutical Microbiology practicals	2018	1.This course help to able to understand the different

				<p>levels of microorganism growth at different conditions.</p> <p>2. Gain knowledge of the various types of sterile products with their formulation in large scale industries and acquire knowledge on GMP standards sanitation, personal hygiene in sterile product manufacturing facilities</p>
45	BPH 309	Medicinal chemistry-II (theory)	2018	<p>1. Gain knowledge on physicochemical and biological aspects of various drug classes.</p> <p>2. Judge the effect of structural modification with respect to biological activity</p> <p>3. Develop awareness about the application of organic synthesis with respect to preparation of drugs</p>
46	BPH310	Pharmacology II– Theory	2018	<p>1. In continuation with the previous semester, this subject would have continued describing about the different drugs used for the treatment of diseases.</p> <p>2. Students understood the mechanism of drug action and its relevance in the treatment of different diseases.</p> <p>3. Have understood about the drugs used to treat respiratory disorders, metabolic disorders, coagulants and anti-coagulants.</p> <p>4. Recognise and explain the rationales behind the use of widely used, national organization approved treatment for the management and treatment of common diseases and conditions.</p> <p>5. Gained knowledge on the new targets of several disease conditions for the treatment</p>
47	BPH311	Pharmaceutical. Analysis II(Theory)	2018	<p>1. Gain knowledge on identification of functional groups of various drugs and other excipients.</p> <p>2. Judge the chemical interaction between the compound that effect on structural modification ions with respect to biological activity</p>

				3.Develop awareness about the analytical equipment which are help to obtain a good quality control of pharmaceutical formulation as per pharmacopeia's
48	BPH312A	Forensic Pharmacy– Theory	2018	<p>1.To recall the pharmaceutical legislations, ethics, right to information, medical termination of pregnancy and intellectual property rights.</p> <p>2.To relate the significance of Drugs and cosmetics act 1940 and its rules 1945 in relation to import and manufacture of drugs.</p> <p>3. To apply the knowledge on schedules pertaining to Drugs and cosmetics act 1940 and its rules 1945 and also administration of the act and rules.</p> <p>4. To understand the functions of pharmacy councils and implementation of education regulations in pharmacy.</p> <p>5. To appraise the importance of medicinal and toilet preparations act and narcotic drugs and psychotropic substances act and rules.</p> <p>6 To discuss the salient features of drugs and magic remedies act, prevention of cruelty to animals' act and drugs price control order.</p>
49	BPH312B	Clinical Trials– Theory	2018	<p>1.Know the regulatory requirements for conducting clinical trial</p> <p>2.To understand the various types of clinical trial designs</p> <p>3.To gain knowledge on basic concepts and establishment of pharmacovigilance</p> <p>4.To know the ADRreporting, methods and tools used in pharmacovigilance</p>
51	BPH313	Medicinal Chemistry-II Practicals	2018	<p>This course helps to how to separation and identification compound given unknown mixture.</p> <p>It imparts take it knowledge on crude separation and</p>

				identification technique
52	BPH314	Pharmacology-II Practicals	2018	<p>1.Handling of different instruments used in Experimental Pharmacology.</p> <p>2.Know about the different routes of drug administration, blood withdrawal etc.,</p> <p>3.Evaluate the different activities on animals.</p> <p>4.Demonstration of different simulation methods.</p> <p>5.They would have finally learnt to apply the knowledge of drugs practically using simulated pharmacological experiments.</p>
53	BPH315	Pharmaceutical. Analysis II Practicals	2018	<p>1.Handling of different analytical instruments.</p> <p>2.Know about the different spectroscopy and chromatography techniques that helps to attain desired quality control of all pharmaceutical aspects as per the standard pharmacopoeias</p> <p>5. Finally learnt to apply the knowledge to make good stability of pharmaceutical product by using of pharmaceutical analytical technicalmethod.</p>
54	BPH 401	Medicinal Chemistry-III	2018	<ol style="list-style-type: none"> 1. To develop an understanding of the physico-chemical properties of drugs. 2. To understand how current drugs were developed by using pharmacophore modelling and docking technique. 3. To acquire knowledge in the chemotherapy for cancer and microbial diseases and different anti-viral agents. 4. To acquire knowledge about the mechanism pathways of different class of medicinal compounds. 5. To have been introduced to a variety of drug

				<p>classes and some pharmacological properties.</p> <p>6. To acquire knowledge on thrust areas for further research</p>
55	BPH 402:	Pharmacology-III	2018	<ol style="list-style-type: none"> 1. Students would have understood the pharmacological actions of different categories of drugs 2. They would have studied in detail about mechanism of drug action at organ system/sub cellular/ macromolecular levels. 3. They would have understood the application of basic pharmacological knowledge in the prevention and treatment of various diseases. 4. They would have observed the effect of drugs on animals by simulated experiments 5. They would get an idea about correlation of pharmacology with other bio medical sciences. 6. They would have understood the signal transduction mechanism of various receptors
56	BPH 403:	Pharmacognosy-III	2018	<ol style="list-style-type: none"> 1. Terpenes, Polyphenols, Alkaloids, Pharmacology, Toxicity, 2. Formulations and Preparations of Herbal Medicines. 3. How herbs influence our physiology and can be helpful against several disorders. <p>DNA Finger printing.</p>
57	BPH 404:	Biopharmaceutics & Pharmacokinetics	2018	<ol style="list-style-type: none"> 1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and them 2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, 3. To understand the concepts of bioavailability and

				bioequivalence of drug products and them Understand various pharmacokinetic parameters, their significance & applications
58	BPH 405A:	Chemistry Of Natural Products	2018	<ol style="list-style-type: none"> 1. To attain detailed knowledge about chemistry of medicinal compounds from natural origin. 2. To understand general methods of structural elucidation of medicinally active natural compounds. 3. To attain knowledge regarding isolation and purification of medicinal compounds from natural origin.
59	BPH 405B:	Hospital & Community Pharmacy	2018	<ol style="list-style-type: none"> 1. Discuss the roles and responsibilities of hospital pharmacist, hospital drug policies and guidelines for hospital pharmacy 2. Discuss various drug distribution methods in a hospital pharmacy 3. Apply various methods of inventory control 4. Formulate parenteral preparations Contribute to a newsletter for providing continuous education and awareness 5. Explain about handling and packaging of radiopharmaceuticals
60	BPH 405C	Pharmacovigilance	2018	<ol style="list-style-type: none"> 1. Explain the regulatory requirements for conducting clinical trial 2. Describe in detail about various types of clinical trial designs 3. Explain the responsibilities of key players involved in clinical trials 4. Describe the documentational requirements for Clinical trials 5. Explain Adverse drug reaction and its management

				<ol style="list-style-type: none"> 6. Describe basic concepts, and establishment of Pharmacovigilance 7. Explain ADR reporting, methods and tools used in Pharmacovigilance 8. Describe Pharmacoeconomics and safety pharmacology
61	BPH 406	Medicinal Chemistry-III Practicals	2018	<ol style="list-style-type: none"> 1. Synthesis compounds of medicinal interest 2. Conduct monograph analysis of the pharmaceutical compounds 3. Determine the amount of drug present in an unknown solution 4. Estimate the purity of drugs by performing assays 5. Determine partition coefficient and dissociation constant of a given compound 6. Conduct planned experiments and prepare laboratory report in a standard format
62	BPH 407	Pharmacology-III Practicals	2018	<ol style="list-style-type: none"> 1. Demonstrate intraperitoneal and intramuscular routes of administration of drugs in animals and describe different anaesthetics used in laboratory animals 2. Identify and select laboratory appliances used in experimental pharmacology 3. Recommend the physiological salt solution for different isolated tissue preparations 4. Perform a bioassay procedure and create a Dose Response Curve 5. Demonstrate the screening of a drug for CNS activity 6. Conduct planned experiments and prepare laboratory report in a standard format
63	BPH 408	Pharmacognosy-III Practicals	2018	<ol style="list-style-type: none"> 1. Identify cell wall constituents and cell inclusions 2. Identify the crude drugs by its morphological

				<p>characteristics and study the anatomical characters by preparing slides</p> <ol style="list-style-type: none"> 3. Perform chemical tests to identify unorganized crude drugs and lipids 4. Prepare herbarium sheets 5. Conduct planned experiments and prepare laboratory report in a standard format
64	BPH 409	Biopharmaceutics & Pharmacokinetics Practicals	2018	<ol style="list-style-type: none"> 1. Compare the in-vitro drug release profile of different marketed products 2. Perform the solubility enhancement techniques for improvement of drug release of poorly water-soluble drugs 3. Estimate the bioavailability (absolute and relative) and bioequivalence from the given clinical data 4. Calculate the drug content in blood sample using Area Under Curve approach 5. Calculate and interpret various pharmacokinetic parameters from the given clinical data
65	BPH 410:	Novel Drug Delivery Systems	2018	<ol style="list-style-type: none"> 1. The use raw data and derive the pharmacokinetic models 2. and parameters the best describe the process of drug absorption, distribution, metabolism and elimination. 3. The critical evaluation of biopharmaceutic studies involving drug product equivalency. 4. The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters. 5. The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic
66	BPH 411	Pharmaceutical Biotechnology (Theory)	2018	<ol style="list-style-type: none"> 1. To know the basics of biotechnology techniques and the various systems used.

				<ol style="list-style-type: none"> 2. To understand the method of genetic engineering for production of rDNA products including monoclonal antibodies. 3. To clarify application of genetic engineering in animals. 4. To understand enzymes and their uses by immobilization. 5. To illustrate the use of fermenter for the production of fermentation products and purification by downstream process.
67	BPH 412:	Clinical Pharmacy & Therapeutics	2018	<ol style="list-style-type: none"> 1. Ability to apply the concepts of Pharmacokinetics to individualize the drug dosage regimen in clinical settings. 2. Ability to design a dosage regimen of a drug based on its route of administration 3. Ability to design and implement pharmacokinetic services 4. Intravenous to Oral conversion of dosage regimens
68	BPH 413:	Comprehensive Viva Voce	2018	<ol style="list-style-type: none"> 1. There shall be a Comprehensive Viva-Voce in IV-year II semester. The Comprehensive Viva-Voce will be conducted by a committee consisting of Head of the Department and two Senior Faculty members of the Department. 2. The Comprehensive Viva-Voce is intended to assess the students understanding of the subjects he studied during the B. Tech. course of study. 3. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. <p>There are no internal marks for the Comprehensive Viva-Voce.</p>
69	BPH 414:	Project Work & Seminar	2018	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Bachelor of Pharmaceutical sciences degree.

				<ol style="list-style-type: none"> 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups. 5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.
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46. M.Pharmacy

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MPH 101A(Pharmacology)	General & Systemic Pharmacology	2018	<ol style="list-style-type: none"> 1. Describe the instruments in experimental pharmacology. 2. Know CPCSEA guidelines and OECD guidelines. 3. Know animal physiology with their biochemical reference values in various animal species. 4. Do collection of blood, body fluids and urine from experimental animals. 5. Record the effect of drug on Concentration Response Curves (CRC) using suitable

				isolated tissue preparations (Synergism and Antagonism).
2	MPH 102A(Pharmacology)	Clinical Pharmacology & Toxicology	2018	<ol style="list-style-type: none"> 1. The pathophysiology of selected disease states and the rationale for drug therapy. 2. The controversies in drug therapy. 3. The importance of preparation of individualized therapeutic plans based on diagnosis. 4. Understanding the concepts of Clinical research;Therapeutic drug monitoring (TDM) ; concepts of Pharmacotherapeutics, Management & Current Good Clinical Practice of various diseases. 5. Studying of various types, mechanisms of Drug interaction; rational for drug combinations; Drug Toxicity and its prevention; Adverse drug reactions and its monitoring
3	MPH 103	Practical 1	2018	<ol style="list-style-type: none"> 1. Recording of concentration response curve (CRC) of acetylcholine 2. Record of the CRC of 5-HT on rat fundus preparation. 3. Record of the CRC of histamine on guinea pig ileum 4. Inotropic and chronotropic effects of drugs on isolated frog heart
4	MPH 104	Practical-II(MAT)	2018	<ol style="list-style-type: none"> 1. Explains the importance of modern

				<p>instrumentation in pharmaceutical analysis</p> <ol style="list-style-type: none"> 2. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms
5	MPH 105	Modern Analytical Techniques and biostatics Theory	2018	<ol style="list-style-type: none"> 1. Explains the importance of modern instrumentation in pharmaceutical analysis 2. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms. <p>Explains the concepts of Statistics and their applications in pharmacy</p>
6.	MPH 106	Human Values and Professional Ethics-I	2018	<ol style="list-style-type: none"> 1. Awareness of ethical issues and basic ethical approaches. 2. Improved writing skills and understanding of ethical conflict. 3. Enables students to develop ability for moral reasoning and act with ethical deliberations. 4. After studying ethics one is equipped with

				<p>the ethical sensitivity and moral understanding required to solve complex ethical dilemmas.</p> <p>5. Learn how to live peacefully</p>
7.	MPH 107	Comprehensive Viva	2018	<p>1. Know the fundamental knowledge on the structure and functions of the various systems of the human body.</p> <p>2. understanding all the homeostatic mechanisms of the body</p> <p>3. Understand the relationship of anatomy with various disciplines of pharmacy.</p> <p>4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition</p>
8.	MPH (Pharmacology) 201A	Molecular Pharmacology	2018	<p>1. Explain the modes of action of drug at the cellular level by describing their interactions with target proteins</p> <p>2. Explain the receptor signal transduction processes.</p> <p>3. Explain the molecular pathways affected by drugs.</p> <p>4. Understanding the applicability of molecular pharmacology and biomarkers in drug discovery process.</p> <p>5. Outline the molecular features that are responsible for agonist and antagonist binding, and coupling to effector</p>

				processes, with reference to the nicotinic, muscarinic, and β -adrenergic receptors
9.	MPH 202 A	Methods in Drug Evaluation	2018	<ol style="list-style-type: none"> 1. Know the commonly used instruments in experimental pharmacology. 2. describe the animal physiology with their biochemical reference values in various animal species. 3. Study of methods for collection of blood, body fluids and urine from experimental animals. 4. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).
10.	MPH 203	Practical 1	2018	<ol style="list-style-type: none"> 1. Calculation of the PA_2 Calculate the PA_2 Value 2. Interpolation bioassay 3. Matching or bracketing bioassay 4. Three point bioassay 5. Four point bioassay
11	MPH 204	Practical-II(BPK)	2018	<ol style="list-style-type: none"> 1. Compare and differentiate between compartmental and non compartmental analysis 2. Identify the physiological, Physicochemical and dosage form related factors that affects drug absorption from

				<p>different dosage forms</p> <ol style="list-style-type: none"> 3. Examine the absolute and relative bioavailability of drugs form different dosage forms using either plasma or urine data. 4. Compare the bioequivalence of two drug products
12	MPH 205	BIO-PHARMACEUTICS & PHARMACOKINETICS	2018	<ol style="list-style-type: none"> 1. Understand the concept of ADME of drug in human body. 2. Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug 3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule
13	MPH 206	Human Values and Professional Ethics-II	2018	<ol style="list-style-type: none"> 1. Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field 2. Learn about morals, values & work ethics. 3. Develop commitment 4. Learn about the different professional roles. 5. Ethical, social and environmental awareness 6. Professional rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct

14	MPH 207	Comprehensive Viva	2018	
15	MPH 301	Mid-Term Evaluation of Research project	2018	<ol style="list-style-type: none"> 6. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 7. Projects offer the opportunity to apply and extend material learned throughout the program. 8. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 9. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups. 10. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.
16	MPH 401	Project thesis submission & presentation and Project Viva voce	2018	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups.

				5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.
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M. Pharmacy (Pharmaceutics)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MPH 101B	ADVANCED PHARMACEUTICAL TECHNOLOGY	2018	<ol style="list-style-type: none"> 1. Course designed to impart advanced knowledge and skills required to learn various aspects and concepts at pharmaceutical industries. 2. The Active Pharmaceutical Ingredients and Generic drug Product 3. The elements of Preformulation studies, Objectives Upon completion of the course, student shall be able to understand Optimization Techniques. 4. Industrial Management and GMP Considerations, development & Stability

				Testing, sterilization process, Pilot Plant Scale Up Techniques & packaging of dosage forms
2	MPH 102B(Pharmaceutics)	Advanced Pharmaceutics	2018	<ol style="list-style-type: none"> 1. Upon completion of this program the student will have fundamental knowledge in preparing conventional dosage forms, pharmaceutical calculation involved in formulation and appreciate the importance of good formulation for effectiveness. 2. The need, concept, design and evaluation of various customized, sustained and controlled release dosage forms using solubility studies and basic theories of dissolution. 3. To formulate and evaluate various novel drug delivery systems based on the molecular weight determination of polymers and its stability studies.
3	MPH 103	Practical-I(PHARMACEUTICS)	2018	<ol style="list-style-type: none"> 1. The passage of drugs, biopharmaceutical parameters. 2. How to do dissolution studies for the dosage forms to know the bioavailability of the drugs. 3. Solubility studies for the drugs based on its pH and its applications in the formulations of drug delivery systems. 4. To determine the molecular weight of the polymers. 5. Gives an fundamental knowledge on the stability studies
4	MPH 104	Practical-II(MAT)	2018	<ol style="list-style-type: none"> 5. Explains the importance of modern

				<p>instrumentation in pharmaceutical analysis</p> <p>6. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR.</p> <p>7. Discusses the principle and applications of chromatographic techniques</p> <p>8. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage form</p>
5	MPH 105	Modern Analytical Techniques and biostatistics Theory	2018	<p>5. Explains the importance of modern instrumentation in pharmaceutical analysis</p> <p>6. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR.</p> <p>7. Discusses the principle and applications of chromatographic techniques</p> <p>8. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms.</p> <p>9. Explains the concepts of Statistics and their applications in pharmacy</p>
6.	MPH 106	Human Values and Professional Ethics-I	2018	<p>6. Awareness of ethical issues and basic ethical approaches.</p> <p>7. Improved writing skills and understanding of ethical conflict.</p> <p>8. Enables students to develop ability for moral reasoning and act with ethical deliberations.</p> <p>9. After studying ethics one is equipped</p>

				with the ethical sensitivity and moral understanding required to solve complex ethical dilemmas. 10. Learn how to live peacefully
7.	MPH 107	Comprehensive Viva	2018	
8.	MPH 201B (Pharmaceutics)	INDUSTRIAL PHARMACY	2018	<ol style="list-style-type: none"> 1. The elements of preformulation studies. 2. Acquire skill in preparation of different types of tablets. 3. Acquire knowledge for evaluation of various dosage forms. 4. Acquire the knowledge of processing of dosage form on large scale that suit pharma industry
9.	MPH202B(Pharmaceutics)	PROCESS VALIDATION & CGMP	2018	<ol style="list-style-type: none"> 1. Acquire knowledge on various quality assurance systems, processes and current regulatory guidelines related to manufacturing and distribution. 2. Address quality issues and provide solutions needed to attain Quality leadership in an environment of continual improvement. 3. Understand the importance of effective documentation. 4. To prepare professionally competent individuals with Quality concept being engrained to achieve global quality standards in pharmaceutical industries
10.	MPH 203	Practical-I	2018	<ol style="list-style-type: none"> 1. Gain knowledge and acquire skills to prepare different types of tablets. 2. Highlights the handling of different equipment's for the preparation and evaluation of various dosage forms
11	MPH 204	Practical-II(BPT)	2018	<ol style="list-style-type: none"> 5. Compare and differentiate between

				<p>compartmental and non compartmental analysis</p> <p>6. Identify the physiological, Physicochemical and dosage form related factors that affects drug absorption from different dosage forms</p> <p>7. Examine the absolute and relative bioavailability of drugs form different dosage forms using either plasma or urine data.</p> <p>8. Compare the bioequivalence of two drug products</p>
12	MPH 205	BIO-PHARMACEUTICS & PHARMACOKINETICS	2018	<p>1. Understand the concept of ADME of drug in human body.</p> <p>2. Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug</p> <p>3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule</p>
13	MPH 206	Human Values and Professional Ethics-II	2018	<p>7. Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field</p> <p>8. Learn about morals, values & work ethics.</p> <p>9. Develop commitment</p> <p>10. Learn about the different professional</p>

				<p>roles.</p> <p>11. Ethical, social and environmental awareness</p> <p>12. Professional rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct</p>
14	MPH 207	Comprehensive Viva	2018	
15	MPH 301	Mid-Term Evaluation of Research project	2018	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups. 5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.
16	MPH 401	Project thesis submission & presentation and Project Viva voce	2018	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply

				<p>and extend material learned throughout the program.</p> <p>3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken.</p> <p>4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups.</p> <p>5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.</p>
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Engineering

Chemical Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MABST 101	Mathematics – I	2018	<p>1. Analyze differential equations and solve them. Apply differential equations to engineering problems</p> <p>2. Use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients.</p>

				<p>3. Solve an initial value problem for an n^{th} order ordinary differential equation using the Laplace transform</p> <p>4. Expand functions as power series using Maclaurin's and Talor's series</p> <p>5. Draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc using curve tracing method to find length, area, volume. Use multiple integral in evaluating area and volume of any region bounded by the given curves.</p>
2	CHBST 102	Chemistry for Chemical Engineering - I	2018	<p>1. Quantum mechanical model of atom, wave mechanical model , Applications to Hydrogen atom.</p> <p>2. Bonding and energy levels of bonding and shapes of many atom molecules , EAN rule for coordination compounds.</p> <p>3. Conformations of cyclic and acyclic systems. Geometrical isomerism, Optical activity and optical isomerism.</p> <p>4. Factors influencing acidity, basicity, and nucleophilicity of molecules, Hyper conjugation.</p> <p>5. Strategies for synthesis of organic compounds.</p>
3	ENHST 103	English	2018	<p>1. Learn the elements of grammar and composition of English Language.</p> <p>2. Learn literary texts such as Short stories and prose passages.</p> <p>3. Maintain linguistic competence through training in</p>

				<p>vocabulary, sentence structures and pronunciation.</p> <ol style="list-style-type: none"> 4. Develop communication skills by cultivating the habit of reading comprehension passages. 5. Develop the language skills like listening, speaking, reading and writing. 6. Make use of self-instructed learner friendly modes of language learning through competence.
4	EEEST104	Basics of Electrical & Electronics Engineering	2018	<ol style="list-style-type: none"> 1. Demonstrate and able to explain electrical components, electrical circuits and 2. Kirchoff's laws. 3. Acquire knowledge of DC circuit analysis, DC network theorems and their applications 4. Formulate and solve complex AC, DC circuits 5. Understand the principles of operation of DC machines, single phase transformers and three phase induction motors 6. Identify the starting methods of starting synchronous and induction motors and speed control methods for DC motors
5	MEEST 105	Engineering Graphics and Design	2018	<ol style="list-style-type: none"> 1. Make a distinction between first angle projection and third angle projection of drawing. 2. Draw hyperbola, parabola, Involutives and Cycloidal curves. 3. Draw sections of solids including cylinders, cones, prisms and pyramids. 4. Draw projections of lines, planes, solids and sections of solids. 5. Draw orthographic projections of lines, planes, and solids.
6	ENHSP 106	English Communication Lab	2018	<ol style="list-style-type: none"> 1. Better pronunciation and accent 2. Ability to use functional English 3. Competency in analytical skills and problem solving skills 4. Increase possibilities of job prospects

				5. Communicate confidently in formal and informal contexts
7	MABST 201	Mathematics-II	2018	<p>Check whether the system of linear equations is consistent or not .Use Cayley-Hamilton theorem to find inverses or powers of matrices.</p> <p>2. Use Eigen values and vectors to reduce Quadratic forms to normal form. Use Green's theorem to evaluate line integrals along simple closed contours on the plane. Use Stokes' theorem to give a physical interpretation of the curl of a vector field</p> <p>3. Find the Fourier Series to represent function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic phenomenon.</p> <p>4. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions.</p> <p>5. Study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena.</p>
8	PYBST 202	Engineering Physics	2018	<p>Develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses</p> <p>2. Understand the quantum mechanics and ultimately the quantum behaviour of charged particles when they are in motion.</p> <p>3. Identify and apply appropriate analytical and</p>

				<p>mathematical tools of Physics in solving Engineering problems</p> <ol style="list-style-type: none"> 4. Apply the basic principles of Mechanics of rigid body and continuous media and their applications 5. Understand the principles in electrostatics and electromagnetics and magnetic properties of materials. 6. Understand size depended properties of nano dimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices. 7. Think and participate deeply, creatively, and analytically in emerging areas of engineering technology. 8. Learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis. 9. Provide multidisciplinary experiences throughout the curriculum.
9	CSEST 203	Programming for Problem Solving	2018	<ol style="list-style-type: none"> . Develop and test programs in C & correct syntax and logical errors 2. Implement conditional branching, iteration and recursion 3. Decompose a problem into functions and synthesize a

				<p>complete program</p> <ol style="list-style-type: none"> 4. Use arrays, pointers, strings and structures to formulate algorithms' and programs 5. Use file to perform read and write operations 6. Handle programming assignments based on class, abstraction, encapsulation, overloading and inheritance.
10	CHBST 204	Chemistry for Chemical Engineering - II	2018	<p>To enable students to identify, formulate, and solve complex chemical engineering problems by applying principles of engineering, science, and mathematics</p> <ol style="list-style-type: none"> 2. To enable students to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors 3. To enable students to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions 4. To enable students to recognize ethical and professional responsibilities in engineering situations 5. To enable students to acquire and apply new knowledge as needed, using appropriate learning strategies

				<p>6. To enable students to communicate effectively with a range of audiences</p> <p>7. To enable students to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives</p>
11	MEESP 205	Workshop / Manufacturing Practice	2018	<p>Design and develop different types of wood joints based on the requirement</p> <p>Design and develop different types of fittings as per requirement</p> <p>Able to develop prototype models by using tin smithy tools.</p> <p>Design and develop different moulds as per practical requirements.</p> <p>Able to connect bulbs either series or parallel</p>
12	CSESP 206	Programming for Problem Solving Lab	2018	<p>Able to know concepts in problem solving</p> <p>To do programming in C language</p> <p>To write diversified solutions using C language</p> <p>Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.</p>

13	CEMCT 207	Environmental Science	2018	<p>Able to understand the importance of the environment Able to identify conservation concepts of natural resources</p> <p>Able to identify problems due to human interactions in the environment</p> <p>Able to understand the enforcement of environment acts in our constitution</p> <p>Capable of managing social issues related to environment</p>
14	MABST 301	Mathematics – III	2018	<p>1. Applying various statistical models and methods for drawing conclusions and making decisions under uncertainty in engineering contexts</p> <p>2 Apply statistical and numerical methods in various computer science related projects, seminars and research</p> <p>3 Apply the knowledge of iterative methods to solve algebraic and transcendental equations, simultaneous linear equations, ODE (ordinary differential equations)</p> <p>4 Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration Demonstrate a basic knowledge of the techniques for accurate and efficient solution of</p> <p>5 models based on linear and nonlinear systems of equations, ordinary differential equations and partial differential equations.</p>

15	CEEST 302	Engineering & Solid Mechanics	2018	<ul style="list-style-type: none"> . Learn about the elastic and plastic behavior of material and evaluate stress invariants, principal stresses and their directions. 2. Euler's Axioms, Free Body Diagrams, Dynamics of point mass models of bodies. 3. Shear Force and Bending Moment 4. Principal Moments of Inertia, Moment of momentum relations for rigid bodies, Euler's Equations of Motion. 5. Concept of strain, strain displacement relations, compatibility conditions, Uniaxial stress and strain analysis of bars.
16	CHPCT 303	Chemical Process Calculations	2018	<ul style="list-style-type: none"> . To understand the dimension-unit systems and their inter relationships, to be able to represent mixture compositions in different forms and to be able to make calculations using reaction stoichiometry. 2. To be able to make mass balance calculations for different operations, without reaction, its mathematical form and its application to different operations and reactions. 3. To be able to make mass balance calculations for different operations, with reaction , its mathematical form and its application to different operations and reactions.

				<ol style="list-style-type: none"> 4. To have learnt the significance of vapor pressure and its dependence and to have learnt different representations of partial saturation and to apply ideal gas law in conjunction with variation in levels of saturation. 5. To be able to estimate parameters like oxygen requirement, flue gas analysis, energy released and flame temperatures.
17	CHPCT 304	Momentum Transfer	2018	<ol style="list-style-type: none"> 1. To be able to perform dimensional analysis of fluid flow problems and develop pressure drop equations for fluid static equipments in which fluid is at rest. 2. To have the knowledge on different types of flow regions in fluid flow, rheological properties of fluids, turbulence and boundary layers. 3. To be able to carry out macroscopic mass, momentum and energy balance to solve engineering problems related to fluid flow and to analyze flow past solid surface, through packed bed and in fluidized beds. 4. Determine the minimum fluidization velocity and terminal velocity of the fluid in Stokes and Newton's law regions. 5. The analysis of fluid flow measuring devices like Orifice meter, Venturimeter, Rotameter and Pitot tube, the construction and working of Centrifugal and reciprocating pumps. And also give the knowledge on different types of

				valve, selection of pipe and fittings.
18	CHPCT 305	Mechanical Unit Operations	2018	<p>To be able to determine the Volume surface mean diameter, mass mean diameter, number of particles and types of mixer</p> <p>To have the knowledge of different types of Crushers, grinders, ultrafine grinders, cutters, to be able to find the power requirement using three crushing laws.</p> <p>3. To be able to calculate the screening effectiveness .To have understood settling processes and flotation technique.</p> <p>4. To develop the rate equations for constant pressure and constant volume filtration techniques and also to solve the problems related to these techniques.To have acquired the construction and operation of different filtration, settling and clarifying equipment.</p> <p>5. To understand the functioning of agitated vessels and to calculate the power consumption.To have the knowledge on different types of turbines, blending and mixing.</p>
19	MABST 402	Probability & Statistics	2018	<p>To make use of the concepts of probability and their applications. Apply Probability theory to find the chances of happening of events.</p> <p>2.To discuss Distributions and Properties and applications.</p> <p>3. To measure the quantity of estimations.</p>

				<p>4. Design the components of a classical hypothesis test. Infer the statistical inferential methods based on small and large sampling tests. Interpret the association of characteristics and through correlation and regression tools.</p> <p>5.To acquire knowledge of Quality control charts.</p>
20	CHPCT 403	Chemical Engineering Thermodynamics – I	2018	<p>To have learnt the fundamental ideas about energy, equilibrium and reversibility. To be able to apply first law to estimate heat and work effects in closed, open and flow systems.</p> <p>2. To understand PV and PT phase diagrams, ideal gas law and its applications. To be able to estimate heat and work effects for different processes – isothermal, isobaric, isometric, and adiabatic processes.</p> <p>3. To be to apply second law of thermodynamics to estimate efficiency of a cycle. To have understood the concept of entropy and its estimation.</p> <p>4. To have learnt different refrigeration cycles and also to be able to calculate their COP.</p>

				5. To have learnt the thermodynamic analysis of flow processes.
21	CHPCT 404	Heat transfer	2018	<ul style="list-style-type: none"> . To be able to calculate the heat transfer flux in one-dimensional heat conduction .To have learnt the concepts of turbulence, boundary layer and analogies. 2. To have understood the construction and flow patterns in heat exchange equipment. 3. To be able to calculate heat flux in natural convection. To be able to estimate heat flux in forced convection. 4. To have understood the concepts of black body, view factors and to be able to calculate radiation heat flux. To be able to handle conduction-convection conduction-convection- radiation heat transfer. 5. To be able to design heat exchangers and condensers. To have understood the functioning of evaporators.
21	CHPCT 405	Mass Transfer – I	2018	<ul style="list-style-type: none"> . To be able to calculate the flux in cases involving diffusive transfer. To appreciate the contribution of turbulence to transfer and to calculate coefficients and from

				<p>them, the flux.</p> <p>2. To be able to differentiate different representations of resistances and to properly integrate them to obtain the overall resistance. To be able to estimate the process parameters like solvent requirement, number of theoretical stages, height and diameter of columns.</p> <p>3. To understand equilibrium relevant to absorption and to calculate the number of stages, number and height of transfer units.</p> <p>4. To understand the equilibrium concerned to humidification, various methods of conducting the operation and to design a cooling tower.</p> <p>5. To understand the mechanism of drying operation and to calculate the time of drying.</p>
22	CHPCT 406	Chemical Technology	2018	<p>Able to differentiate unit operations and unit processes. To Know the basic principles of different unit operations. Able to know constituents of petroleum, and the extraction of petroleum compounds petrol, diesel</p> <p>2. Can understand the raw materials and production of Ammonia, Urea, Phosphorus industries.</p> <p>3. Can understand the raw materials, pulp and paper industry, reactions involved and the production of sugar,</p>

				<p>starch.</p> <p>4. Get knowledge about alcohol, soaps, edible oils, hydrogenation of oils and extraction of vegetable oils.</p> <p>5. Can understand the difference between paints and varnishes and about the production.</p> <p>Know the classification of plastics, industrial production of plastics and rubbers.</p>
23	CHBST 407	Fundamentals of Bio-technology	2018	<p>Able to know about structures of yeast, bacteria, molds and their growth .Able to understand about structures of prokaryotic and eukaryotic cells with examples</p> <p>2. Can know the classification, structure and properties of carbohydrates, lipids and nucleic acids</p> <p>3. Able to know the types of proteins, structures and their functional relationship</p> <p>4. Get knowledge of cell metabolism, concepts of bio energetic and different bio chemical fermentation processes</p> <p>5. Can understand about the nature of fermentation, oxygen requirements and biochemical mechanisms of lactic acid, ethanol.Can understand about genomes and plasmids, rDNA technology and cloning</p>
24	MABST 501	Numerical Methods in Chemical Engg.	2018	<p>After the completion of course, students will be able to Apply numerical methods to solve all type of equations.</p>

				<p>Finite Differences And Difference Equations</p> <ol style="list-style-type: none"> 2. Derive interpolating polynomials using interpolation formulae. 3. Analyse the data and develop skills to solve Algebraic & Transcendental Equations. 4. To find the Solution Of Linear And Non-Linear Algebraic Equations. 5. Derive numerical methods solution of Ordinary & Partial Differential Equations .
25	CHPCT 502	Chemical Engineering Thermodynamics – II	2018	<ol style="list-style-type: none"> 1.To be able to develop and use expressions for property estimation. To be able to calculate property values from equations of state. 2. To have learnt the concepts of residual, excess, partial molar properties and property changes of mixing. To have understood concepts of ideal solutions, fugacity and activity coefficient. 3. To be able to use modified forms of Raoult’s law for non-ideal systems, Dewpoint and bubble point calculations. 4. To be able to make phase equilibrium calculations using Raoult’s law. To have learnt the concepts of LLE and VLLE. 5. To have learnt the concept of equilibrium constant and its calculation. To be able to estimate equilibrium conversion of

				single and simple multiple reactions.
26	CHPCT 503	Mass Transfer – II	2018	<p>To be able to analyze different phase diagrams – pxy, txy, hxy, bimodal solubility curve and Nxy representations. To be able to calculate flash calculations. To be able to apply Rayleigh’s equation (differential distillation).</p> <p>2. To be able to calculate the number of ideal stages using Ponchon-Savarit and McCabe- Theile procedures. To acquire a fundamental understanding of azeotropic and extractive distillation.</p> <p>3. To be able to calculate the solvent requirement and number of stages for different contacting patterns like single stage, cross current and countercurrent modes.</p> <p>4. To be familiar with different constructions of equipment suitable for extraction and leaching.</p> <p>5. To be able to explain the equilibrium of adsorption and to calculate the material requirement and number of stages for different contacting schemes. To have visualized fixed and moving bed adsorption and regeneration.</p>
27	CHPCT 504	Chemical Reaction Engineering – I	2018	<p>To be able to write rate expressions for elementary reactions and to study the temperature dependence of reactions.</p> <p>2. b. To be able to apply analytical procedures (integral, differential, fractional life, initial velocity methods) to</p>

				<p>convert batch reactor data in to kinetic expression.</p> <p>3. d. To be able to make performance analysis of multiple reactor systems – PFR in series and parallel, CSTRs in series and in parallel, mixed reactors in series.</p> <p>4. e. To be able to analyse multiple reactions – series, parallel and series-parallel. To be able to suggest reaction controls for desired product distribution.</p> <p>5. g. To be able to estimate heat effects of industrial reactions. To be able to suggest optimum temperature progression.</p>
28	CHPCT 504 B	Program Elective- I	2018	<p>. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability.</p> <p>2. An ability to recognition of the water treatment processes and control methodologies for air pollution. An ability to use different techniques for hazard waste treatment. Able to understand about removal of BOD, Chromium and Particulate matter.</p> <p>3. An ability to know about the main sources of different types of pollutions and control methods, Student can reach to</p>

				<p>reduce the pollution control aspects of fertilizer industries, petroleum refineries.</p> <p>4. An ability to know types of air pollution and their effect on vegetation, control methodologies for air pollution. Characteristics of municipal solid waste, its treatment methods.</p>
29	CHPCT 601	Chemical Reaction Engineering - II	2018	<p>Residence time Distribution of fluid in Vessels, the F curve the C curve Relations.</p> <p>Formulate a residence time distribution from tracer experiment results and use it to predict conversion in a non-ideal reactor.</p> <p>2. Write reaction rate equations for common types of homogeneous and heterogeneous reactions. Physical adsorption and Chemical Adsorption.</p> <p>3. Identify the mechanisms involved in a heterogeneous reaction and formulate an effective rate equation.</p> <p>4. Calculate the impact of changing solid (or fluid) properties on the conversion of a heterogeneous reaction.</p> <p>5. Fluid particle non-catalytic reactions. unreacted core model for spherical particles, chemical reaction controls.</p>
30	CHPCT602	Transport Phenomena	2018	<p>. Have the knowledge of derivations of the momentum,</p>

				<p>heat, mass flux distributions and also velocity, temperature, concentration distributions for various systems.</p> <p>2. Able to Solve continuity, Navier-Stokes and energy equations to analyze engineering problems related to Newtonian fluid flow laminar flow, Perform dimensionless forms of three transport phenomena.</p> <p>3. Educate about the formation and calculation of fluid friction in pipes, conduits and around sphere.</p> <p>4. Know the different types of heat transfer coefficients and performance of liquid – liquid ejector. Have the knowledge of temperature, pressure dependence of viscosity, thermal conductivity and mass diffusivity.</p> <p>5. Understand the diffusion with homogeneous and heterogeneous chemical reaction.</p>
31	CHPCT603	Process Dynamics & Control	2018	<p>To be able to model physical systems/processes like thermometer / level systems / manometer. To have acquired the ability to study the response behavior of systems.</p> <p>2. To be able to suggest an appropriate controller for an application. To develop feed back control loops and reduce it to single block representation for further analysis.</p> <p>3. To be able to construct and analyze Routh array.</p>

				<p>4. To be able to obtain the locus of roots of a characteristic equation. To be able to make stability analysis-based frequency response (Bode plots) approach.</p> <p>5. To have learnt the basics of advanced control strategies. To have learnt controller tuning rules.</p>
32	MEHST604	Industrial Management	2018	<p>Understand the evolutionary development of management thought, general principles of management and concept of entrepreneurship.</p> <p>2. Able to identify and design plant location, plant layout, material handling systems and apply forecasting and PPC techniques to production systems.</p> <p>3. To realize the importance of significance of quality, manage quality improvement teams and identify requirements of quality improvement programs for various industries.</p> <p>4. Able to construct an operating characteristic curve for various sampling plans, construct and interpret various charts and apply quality improvement techniques in real world situations.</p> <p>5. Understand the philosophy and basic concepts of quality improvement, design, use, and interpret control charts for variables, attributes, and quality improvement techniques</p>

33	CHOET607	Open Elective – II Online	2018	<p>Able to understand classification, properties and the structures of Engineering materials.</p> <p>Able to have knowledge on Crystal imperfections.</p> <p>2. To learn various deformations regarding Creep, Fracture, Cold and Hot working. Able to understand Phase diagram and its applications. To learn various heat treatment process regarding Annealing, Quenching and Tempering.</p> <p>3. Able to understand the Mechanical and Electrical properties of Ceramic materials. Able to understand various forms of Composites.</p> <p>4. Able to learn various forms of Corrosion. Able to have knowledge on Corrosion prevention and control.</p>
34	CHPCT701	Plant Design & Process Economics	2018	<p>. Students will have knowledge to understand design considerations and engineering ethics. Students able to understand plant location, plant lay out, plant operation and control in a profitable way.</p> <p>2. Students able to design process flow diagrams, piping and instrumentation diagrams and vessel and piping layout.</p> <p>3. Students will have the knowledge on interest, time value of money and cash flow patterns useful for cost estimation.</p>

				<p>4. Students will have an idea on analysis of cost estimation involves capital investments, estimation of revenue, and cost indexes, students will come to know factors affecting investment and production costs.</p> <p>5. They will be able to find out the alternate investments and replacements, it will also help the students to understand profitability standards and methods for calculating profitability.</p>
35	CHPCP 704	Process Equipment Design & Drawing	2018	<p>Distinguish between ethical and non ethical situations. Practice moral judgment in conditions of dilemma.</p> <p>2. Relate the code of ethics to social experimentation.</p> <p>3. Risk benefit analysis and reducing risk</p> <p>4. Resolve moral responsibilities in complications.</p> <p>5. Defend one's views in supporting the moral concerns. Apply risk and safety measures in various engineering fields.</p>

Chemical Engineering M.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	CHPC 01	Mathematics & Statistical Methods in Chemical Engineering	2018	<p>1. Students should be able to solve system of linear algebraic equations</p> <p>2. Students should be able to do numerical integrations of functions.</p> <p>3. Students should be able to fit relationship between two</p>

				<p>data sets using linear, non-linear regression.</p> <p>4. Students should be able to calculate maxima/minima and functions</p>
2	CHPC 02	Advanced Transport Phenomena	2018	<p>1. Understand the mechanism of momentum, heat and mass transport for steady and unsteady flow.</p> <p>2. Perform momentum, energy and mass balances for a given system at macroscopic and microscopic scale.</p> <p>3. Solve the governing equations to obtain velocity, temperature and concentration profiles.</p> <p>4. Model the momentum, heat and mass transport under turbulent conditions.</p> <p>5. Develop analogies among momentum, energy and mass transport.</p>
3	CHPE 11	Process Design & Synthesis	2018	<p>1. Analyze alternative processes and equipment</p> <p>2. Synthesize a chemical process flow sheet that would approximate the real process</p> <p>3. Design best process flow sheet for a given product</p> <p>4. Perform economic analysis related to process design and evaluate project profitability</p>
4	CHPE 12	Chemical Reactor Analysis	2018	<p>1. Evaluate heterogeneous reactor performance considering mass transfer limitations</p> <p>2. Perform the energy balance and obtain concentration profiles in multiphase reactors.</p> <p>3. Estimate the performance of multiphase reactors under</p>

				non-isothermal conditions
5	CHPE 13	Fluidization Engineering	2018	<ol style="list-style-type: none"> 1. Performing and understanding the behavior fluidization in fluidized bed 2. Evaluate the characterization of particles and power consumption in fluidization regimes 3. Understanding the applicability of the fluidized beds in chemical industries
6	CHPE 14	Process Plant Simulation	2018	<ol style="list-style-type: none"> 1) Modeling Aspects and Classification of Mathematical Modeling 2) How to Prepare Models from Mass Transfer and Models on Heat Transfer 3) How to Prepare Models from Fluid Flow and Models on Reaction Engineering 4) The analysis through Propagation of Errors, Error Methods, Data Regression Methods and Process Simulation 5) Decomposition of Networks and Convergence Promotion
7	CHPE 21	Industrial Pollution Control	2018	<ol style="list-style-type: none"> 1. Recognize the causes and effects of environmental pollution 2. Analyze the mechanism of proliferation of pollution 3. Develop methods for pollution abatement and waste minimization 4. Design treatment methods for gas, liquid and solid wastes
8	CHPE 22	Applications of Nanotechnology in Chemical Engineering	2018	<ol style="list-style-type: none"> 1. Understanding the different top down and bottom up approaches for nanoparticles. 2. the different applications of nanoparticles in chemical engineering field. 3. Learning the characterization techniques for

				nanoparticles
9	CHPE 23	Chemo-informatics	2018	<p>1. The course will introduce the students preparing for professional work in chemistry must learn how to retrieve specific information from the enormous and rapidly expanding chemical literature.</p> <p>2. The course will provide a broad overview of the computer technology to chemistry in all of its manifestations.</p> <p>3. The course will expose the student to current and relevant applications in QSAR and Drug Design.</p>
10	CHPE 24	Advanced Control Systems	2018	<p>1) Feed Forward, Ratio Controls and Advanced Controllers</p> <p>2) Control Loop Interactions & Optimization</p> <p>3) Digital Computer Control, selection of sampling period, comparison of analog and digital filters</p> <p>4) Finite Difference Models, Z-Transforms, Pulse Transfer Functions</p> <p>5) Samples and Data Control Systems</p>
11	CHPP 01	Computational Techniques Lab	2018	<p>1. Use numerical methods for various manipulations and be capable of implementing them on a computing system</p>
12	PGMC 41	Research Methodology & IPR	2018	<p>Understand research problem formulation. - Analyze research related information - Follow research ethics - Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</p> <p>Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.</p>

				Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
13	PGPA 11	English For Research Paper Writing	2018	<ol style="list-style-type: none"> 1) Applies the concepts of diffusion mass transfer, mass transfer coefficients, convective mass transfer, inter-phase mass transfer, equipment for gas-liquid operations 2) Suggest and design equipment for various mass transfer operations 3) Study of the stage wise mass transfer operations, principles of various stage wise contact processes like distillation 4) Student will be able to select a separation process for a particular system. 5) Able to understand the energy requirements of separation processes
14	PGPA 12	Disaster Management	2018	<ol style="list-style-type: none"> 1) learn the importance of RTD and Non-ideal flow in reacting vessels. 2) Calculate the conversions based on segregated flow model, dispersion model and tanks-in- series models. 3) Understand the diffusion and reaction in a porous catalyst. 4) Learn the factors influencing catalyst decay, the role of pore diffusion on catalyst activity rate. 5) Understand the design of heterogeneous catalytic reactors.
15	CHPE 31	Modern Concepts in Catalysis & Surface Phenomenon	2018	<ol style="list-style-type: none"> 1. To understand the concepts of homogenous and heterogeneous catalysis, with specific examples. 2. To study reaction mechanisms and kinetics of homogenous and heterogeneous catalytic reactions.

				<p>3. To familiarize with the characterization of catalysts</p> <p>4. To understand the application and mechanisms of several types of catalysts in chemical industry.</p>
16	CHPE 32	Advanced Downstream Processing	2018	<p>1. To learn effective strategies of downstream processing in chemical industry.</p> <p>2. Understand the role of downstream processing.</p> <p>3. Analyze reactors, upstream and downstream processes in production</p>
17	CHPE 33	Computational Fluid Dynamics	2018	<p>1. Understand the basic principles of mathematics and numerical concepts of fluid dynamics.</p> <p>2. Develop governing equations for a given fluid flow system.</p> <p>3. Adapt finite difference techniques for fluid flow models.</p> <p>4. Apply finite difference method for heat transfer problems.</p> <p>5. Solve computational fluid flow problems using finite volume techniques.</p>
18	CHPE 34	Enzyme Science & Engineering	2018	<p>1) Know the mechanisms of Chemical and Enzyme Catalysts</p> <p>2) Develop, understand and apply Kinetic Models</p> <p>3) Formulate and Analyze Immobilized Enzyme Kinetics</p> <p>4) Design and analyze Enzyme Reactors</p> <p>5) Gain knowledge on Applications of Enzyme and on Biosensors</p>
19	CHPE 35	Optimization Theory & Practice	2018	<p>1) formulate and analyse the optimization of the given physical situation.</p> <p>2) Apply different methods of optimization and to suggest a technique for specific problem</p> <p>3) Understand the difference between constrained and unconstrained optimization</p> <p>4) Understand the importance of linear programming</p>

				problems 5) Realize the importance of optimization by understanding different examples
20	CHPE 36	Micro and Nano Fluidics	2018	1. Introduce students to the physical principles to analyze fluid flow in micro and nano-size devices. It unifies the thermal sciences with electrostatics, electrokinetics, colloid science; electrochemistry; and molecular biology.
21	CHPE 37	Process Intensification	2018	1. Assess the values and limitations of process intensification, cleaner technologies and waste minimization options. 2. Measure and monitor the usage of raw materials and wastes generating from production and frame the strategies for reduction, reuse and recycle. 3. Obtain alternative solutions ensuring a more sustainable future based on environmental protection, economic viability and social acceptance. 4. Analyze data, observe trends and relate this to other variables. 5. Plan for research in new energy systems, materials and process intensification.
22	CHPE 41	Phase Transitions in Process Equipment	2018	1. The student is expected to obtain considerable insight into various types of phase transitions, and how these can be described theoretically in different ways 2. Predict relationships between physical quantities using the laws and methods of thermodynamics. 3. Find probabilities and thermal quantities (free energy, entropy, etc) given the energy eigen values of a system. 4. The student is expected to obtain considerable insight into various types of phase transitions, and how these can be described theoretically in different ways

				<p>5. Predict relationships between physical quantities using the laws and methods of thermodynamics.</p> <p>6. Find probabilities and thermal quantities (free energy, entropy, etc) given the energy eigen values of a system.</p>
23	CHPE42	Process Integration	2018	<p>1. Maximum heat recovery for a given process (both new processes, and retrofit of existing processes) identify opportunities for integration of high-efficiency energy.</p> <p>2. Energy-intensive thermal separation operations (distillation, evaporation) at an industrial process site.</p> <p>3. Evaluate the process integration measures with respect to energy efficiency, greenhouse gas emissions and economic performance</p>
24	CHPE 43	Transport in Porous Media	2018	<p>1. Students will understand the mechanisms involved in transport processes in porous media and will be able to work with the equations that govern the fate and transport of gas, water and solutes in porous media.</p>
25	CHPE 44	Microflow Chemistry & Process Technology	2018	<p>1. Students will understand the role of micro flow chemistry and process technology in chemical engineering.</p> <p>2. The student is expected to obtain considerable insight into various types of micro reactors.</p>
26	CHPE 45	Process Plant Design & Flow sheeting Tools	2018	<p>1. Analyze, synthesize and design processes for manufacturing products commercially</p> <p>2. Integrate and apply techniques and knowledge acquired in other courses such as thermodynamics, heat and mass transfer, fluid mechanics, instrumentation and control to design heat exchangers, plate and packed columns and engineering flow diagrams</p> <p>3. Use commercial flow sheeting software to simulate</p>

				<p>processes and design process equipment</p> <p>4. Recognize economic, construction, safety, operability and other design constraints</p> <p>5. Estimate fixed and working capitals and operating costs for process plants</p>
27	CHPE 46	Process Synthesis & Analysis	2018	<p>1) understand the concepts of Engineering economics</p> <p>2) Able to estimate various costs involved in a process industry and evaluate the tax burden of an establishment</p> <p>3) Able to estimate profitability of a company</p> <p>4) Understand the heat exchanger networks and their importance in industry</p> <p>5) Compute break even period for an investment and rate of return</p>
28	CHPE 47	Membrane Separations	2018	<p>1) Knowledge on Preparation and Characterization of Materials and Types of Membrane</p> <p>2) Knowledge on Nano-Filtration, Ultra-Filtration and Micro-Filtration</p> <p>3) Knowledge on Designing Reverse Osmosis and Dialysis</p> <p>4) Concepts of Gas Separation and Pervaporation and Design of Pervaporation Module</p> <p>5) Knowledge on Ion Exchange Membrane Process, Liquid Membranes and Other Membrane Processes</p>
29	CHPP 02	Advanced Chem. Engg. Lab	2018	<p>1. to design and perform Chemical Engineering related experiments</p>
30	CHPE 51	Design of experiments and parameter estimation	2018	<p>1. Plan experiments for a critical comparison of outputs</p> <p>2. Include statistical approach to propose hypothesis from experimental data</p> <p>3. Implement factorial and randomized sampling from experiments</p> <p>4. Estimate parameters by multi-dimensional</p>

				optimization
31	CHPS 02	Seminar – II	2018	<ol style="list-style-type: none"> 1. Plan experiments for a critical comparison of outputs 2. Include statistical approach to propose hypothesis from experimental data 3. Implement factorial and randomized sampling from experiments 4. Estimate parameters by multi-dimensional optimization
32	CHPE 51	Design of Experiments & Parameter Estimation	2018	<ol style="list-style-type: none"> 1. Plan experiments for a critical comparison of outputs 2. Include statistical approach to propose hypothesis from experimental data 3. Implement factorial and randomized sampling from experiments 4. Estimate parameters by multi-dimensional optimization
33	CHPE 52	Computer Aided Design	2018	<ol style="list-style-type: none"> 1. Students get the knowledge about computer Aided Flow Sheet Synthesis 2. Computer aided equipment design of Evaporators; Distillation columns; Reactors, adsorption columns
34	CHPE 53	Cleaner Production	2018	<ol style="list-style-type: none"> 1. Explain the concept and principles of cleaner production. 2. Suggest different unit operations in industrial production process to minimize pollutions. 3. Plan good housekeeping practices for Industry/other places with concern of safety, hygiene and waste reduction. 4. Suggest basic methods and techniques of pollution prevention during production.

				5. Suggest cleaner production methods for a given situation which will also lead to cost reduction in long run
35	CHPE 54	Fuel Cell Systems	2018	<ol style="list-style-type: none"> 1) Classify Fuel Cells, and understand factors affecting efficiency of electrochemical energy 2) Construct, operate AFC & MCFC 3) Gain knowledge on manufacturing and materials, environmental impacts and applications of PAFC & SOFC 4) Gain knowledge on electrode- oxidation of methanol and crossover to DMF and Engineering Aspects 5) Gain knowledge on Technological and Economical Challenges on PEMFC
36	CHPE 56	Bioprocess Engineering	2018	<ol style="list-style-type: none"> 1. Understand the different cells and their use in biochemical processes. 2. Understand the role of enzymes in kinetic analysis of biochemical reaction. 3. Analyze bioreactors, upstream and downstream processes in production of bio-products 4. Demonstrate the fermentation process and its products for the latest industrial revolution
37	PGOP 11	Business Analytics	2018	<ol style="list-style-type: none"> 1. Students will demonstrate knowledge of data analytics. 2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics. 3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.

				4. Students will demonstrate the ability to translate data into clear, actionable insights.
38	PGOP 13	Operations Research	2018	<p>1. Students should be able to apply the dynamic programming to solve problems of discrete and continuous variables.</p> <p>2. Students should be able to apply the concept of non-linear programming</p> <p>3. Students should be able to carry out sensitivity analysis</p> <p>4. Student should be able to model the real world problem and simulate it.</p>
39	PGPA 13	SANSKRIT FOR TECHNICAL KNOWLEDGE	2018	<p>1. Understanding basic Sanskrit language</p> <p>2. Ancient Sanskrit literature about science & technology can be understood</p> <p>3. Being a logical language will help to develop logic in students</p>
40	PGPA 14	Value Education	2018	<p>1. Knowledge of self-development</p> <p>2. Learn the importance of Human values</p> <p>3. Developing the overall personality</p>
41	PGPA 21	CONSTITUTION OF INDIA	2018	<p>1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.</p> <p>2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</p> <p>3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership</p>

				of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. Discuss the passage of the Hindu Code Bill of 1956.
42	PGPA 22	PEDAGOGY STUDIES	2018	1.What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries? 2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners? 3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?
43	PGPA 23	STRESS MANAGEMENT BY YOGA	2018	1. Develop healthy mind in a healthy body thus improving social health also 2. Improve efficiency
44	PGPA 24	PERSONALITY DEVELOPMENT THROUGH LIFE ENHANCEMENT SKILLS	2018	1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life 2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity 3. Study of Neetishatakam will help in developing versatile personality of students.

Civil Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of	Course Outcomes
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			Introduction	
1	MABST 101	Mathematics – I	2018	<ol style="list-style-type: none"> 1. analyze differential equations and solve them 2. apply differential equations to engineering problems. 3. use transformation to convert one type into another type presumably easier to solve. 4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients. 5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform. 6. expand functions as power series using Maclaurin's and Taylor's series 7. optimize the problems related to OR, Computer science, Probability and Statistics 8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc using curve tracing method to find length, area, volume. 9. use multiple integral in evaluating area and volume of any region bounded by the given curves.
2	CYBST 102	Engineering Chemistry	2018	<ol style="list-style-type: none"> 1. analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. □ □ 2. rationalise bulk properties and processes using thermodynamic considerations. □ 3. distinguish the ranges of the electromagnetic spectrum used for exciting different <ul style="list-style-type: none"> □ molecular energy levels in various spectroscopic techniques □ 4. rationalise periodic properties such as ionization

				<p>potential, electronegativity, <input type="checkbox"/> oxidation states and electronegativity. <input type="checkbox"/> 5. list major chemical reactions that are used in the synthesis of molecules. <input type="checkbox"/></p>
3	ENHST 103	English	2018	<p>1. learn the elements of grammar and composition of English Language.</p> <p>2. Learn literary texts such as Short stories and prose passages.</p> <p>3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation.</p> <p>4. develop communication skills by cultivating the habit of reading comprehension passages.</p> <p>5. develop the language skills like listening, speaking, reading and writing.</p> <p>6. make use of self-instructed learner friendly modes of language learning through competence.</p>
4	EEEST 104	Basic Electrical & Electronics Engineering	2018	<p>1. understand the basic concepts of D.C. single phase and 3- phase supply and circuits and solve basic electrical circuit problems</p> <p>2. understand the basic concepts of transformers and motors used as various industrial drives</p> <p>3. understand the concept of power factor improvement for industrial installations and concepts of most economical power factor</p> <p>4. understand the operation and characteristics of diodes, transistors, integrated circuits and digital circuits</p>
5	MEEST 105	Engineering Graphics & Design	2018	<p>1. make a distinction between first angle projection and third angle projection of drawing.</p> <p>2 draw hyperbola, parabola, Involutives and Cycloidal</p>

				<p>curves.</p> <p>3. draw sections of solids including cylinders, cones, prisms and pyramids.</p> <p>4. draw projections of lines, planes, solids and sections of solids.</p> <p>5. draw orthographic projections of lines, planes, and solids.</p>
6	ENHSP 106	English Communication Lab	2018	The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
7	MABST 201	Mathematics – II	2018	<ol style="list-style-type: none"> 1. use ranks of matrices to decide whether the system of linear equations is consistent or not 2. use Cayley-Hamilton theorem to find inverses or powers of matrices. 3. use Eigen values and vectors to reduce Quadratic forms to normal form. 4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications. 5. use Green's theorem to evaluate line integrals along simple closed contours on the plane 6. use Stokes' theorem to give a physical interpretation of the curl of a vector field 7. use the divergence theorem to give a physical interpretation of the divergence of a vector field. 8. find the Fourier Series to represent a function as a series of constants times sine and cosine functions of different frequencies in order to observe periodic

				<p>phenomenon.</p> <p>9. Evaluate certain improper integrals to make them simple with introduction of Gamma and Beta functions.</p> <p>10. study certain special functions that arise in solving certain ordinary differential equations to model many physical phenomena</p>
8	PYBST 202	Engineering Physics	2018	<ol style="list-style-type: none"> 1. develop appropriate competence and working knowledge of laws of modern Physics in understanding advanced technical engineering courses 2. understand the quantum mechanics and ultimately the quantum behaviour of charged particles when they are in motion. 3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems 4. apply the basic principles of Mechanics of rigid body and continuous media and their applications 5. understand the principles in electrostatics and electromagnetics and magnetic properties of materials. 6. understand size depended properties of nanodimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices. 7. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.
9	CSEST 203	Programming for Problem solving	2018	<ol style="list-style-type: none"> 1. Learn about fundamentals of computer and programming language, draw flow chart to solve given problem logically and develop algorithm to solve given program

				<p>2. Able to use the concept of branching and looping to design efficient C program and be able to apply the concepts of user defined function and recursion to support reusability</p> <p>3. Able to discuss basic algorithmic analysis for simple algorithms; determine appropriate algorithmic approaches to a real world problems.</p> <p>4. Apply fundamental programming concepts, using a functional programming language, to solve problems.</p> <p>5. Design and develop a modular program in C for commercial billing activities using an array of structures and pointers.</p>
10	CEEST 204	Engineering Mechanics	2018	<p>1. apply the basic knowledge of force system.</p> <p>2. know the types of supports occur in civil engineering structures</p> <p>3. know the geometrical properties of different cross sections.</p> <p>4. understand different types of stresses and strains, elastic constants.</p> <p>5. understand the behavior of different internal forces under different types of loading</p>
11	MEESP 205	Workshop/Manufacturing Practices	2018	Upon completion of this course, the students will gain knowledge of the different manufacturing processes which

				are commonly employed in the industry to fabricate components using different materials.
12	CSESP 206	Computer Programming Lab	2018	<ol style="list-style-type: none"> 1. formulate simple algorithms for arithmetic and logical problems. 2. translate the algorithms to programs (in C language). 3. test and execute the programs and correct syntax and logical errors. 4. implement conditional branching, iteration and recursion. 5. decompose a problem into functions and synthesize a complete program using divide and conquer approach. 6. use arrays, pointers and structures to formulate algorithms and programs.□ 7. apply programming to solve matrix addition and multiplication problems and searching and sorting problems. and□
13	CEMCT 207	Environmental Science	2018	<ol style="list-style-type: none"> 1. acquire knowledge in <ul style="list-style-type: none"> • diverse components of environment and natural resources • ecosystem and biodiversity & its conservation methods • population growth and human health • green technology 2. identify and resolve the issues related to sources of different types of pollutions 3. provide solutions to individuals, industries and government for sustainable development of natural resources 4. apply environmental ethics in protection of diversified ecosystems.
14	MABST 301	Mathematics – III	2018	<ol style="list-style-type: none"> 1. Solve field problems in engineering involving PDEs.

				2. They can also formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
15	CEPCT 302	Strength of Materials	2018	1) Develop shear force and bending moment diagrams for different load cases 2) Compute the flexural stresses for different load cases and different cross-sections
16	CEPCT 303	Surveying	2018	<ul style="list-style-type: none"> • Measure and layout elevations and relative position of points, understand plans and field notes. • Perform computations using information gathered from differential levelling, traversing, area calculations, and volume/ earthwork. • Ability to design and set out curves • Ability to use modern surveying equipment • Calculate angles, distances and levels • Identify data collection methods and prepare field notes • Understand the working principles of survey instruments • Estimate measurement errors and apply corrections • Interpret survey data and compute areas and volumes
17	CEPCT 304	Building Materials and Construction Technology	2018	<ul style="list-style-type: none"> • To find the suitability various building materials at a particular location in the building construction. • To know the preparation of concrete and tests to be performed • Ability to utilize various modern building

				<p>materials like timber products, protective coatings, and fibre textiles</p> <ul style="list-style-type: none"> • Able to know the different types of concretes their application, mix design and tests. • To develop acquaintance over service requirements like protectives, damp and termite proofing. • Able to repair and rehabilitation of distressed structures and use of construction equipment in the field.
18	MEEST 305	Basic Mechanical Engineering	2018	<p>Understand basics of thermodynamics and components of thermal plant</p> <p>2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice.</p> <p>3. Understand basics of heat transfer, refrigeration and internal combustion engines.</p> <p>4. Understand mechanism of power transfer through belt, chain, rope and gear drives.</p> <p>5. Understand functions and operations of machine tools including milling, grinding, and shaping machines.</p>
19	CEPCT 306	Engineering Geology	2018	<p>1. To apply the geological knowledge to Civil Engineering Constructions, at different stages. The kind of study exposes the geological draw backs, if any.</p> <p>2. To help the site engineers to take suitable precautionary measures to overcome the drawbacks but also to take advantage of the site geology findings wherever possible.</p> <p>3. To take precautionary measures in civil engineering constructions based on geological parameters.</p>
20	CEPCP 307	Surveying Lab	2018	<p>1. Ability to use the techniques, skill and surveying equipment for engineering practice.</p> <p>2. Applying mathematics concepts in the field of surveying.</p>

				3. Develop an understanding of modern surveying equipment
21	CEPCP 308	Engineering Geology Lab	2018	1. The study and identification of minerals, rocks and structures with their utilization in civil engineering works
22	PAMCT 401	Constitution of India	2018	<input type="checkbox"/> Understand historical background of the constitution making and its importance for building a democratic India. <input type="checkbox"/> Understand the functioning of three wings of the government i.e., executive, legislative and judiciary. <input type="checkbox"/> Understand the value of the fundamental rights and duties for becoming good citizen of India. <input type="checkbox"/> Analyze the decentralization of power between central, state and local self-government. <input type="checkbox"/> Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy. 1. Know the sources, features and principles of Indian Constitution. 2. Learn about Union Government, State government and its administration. 3. Get acquainted with Local administration and Pachayati Raj. 4. Be aware of basic concepts and developments of Human Rights. 5. Gain knowledge on roles and functioning of Election Commission
23	MABST 402	Mathematics – IV	2018	<ul style="list-style-type: none"> ● evaluate approximating the roots of polynomial and transcendental equations by different algorithms ● Apply different algorithms for approximating the solutions of ordinary differential equations to its

				<p>analytical computations</p> <ul style="list-style-type: none"> ● apply discrete and continuous probability distributions ● design the components of a classical hypothesis test <p>infer the statistical inferential methods based on small and large sampling tests</p>
24	CEPCT 404	Structural Analysis	2018	<ul style="list-style-type: none"> ● Understand various engineering properties of materials ● Estimate magnitudes under combined loads in members and structures ● Determine shear stresses for different cross-sections. ● Determine deflection at any point on a beam under simple or combined loads ● Apply failure criteria to implement in design of structural members. ● Analyze members under torsion, combined torsion and bending moment for determination of energy absorption
25	CEPCT 405	Environmental Engineering	2018	<ol style="list-style-type: none"> 1. Able to estimate the water demand and classify the various sources of water. 2. Able to explain the water quality characteristics and types of conduits used for carrying of water 3. Able to design the water treatment plant units
26	CEPCT 406	Soil Mechanics	2018	<ul style="list-style-type: none"> ● Identify various soils based on their characteristics. ● Evaluate permeability and seepage of soils. ● Determine compaction characteristics of soils. ● Calculate consolidation time and settlement of soils. ● Determine Shear Characteristics of soils

27	CEPCD 407	Computer aided Building Drawing	2018	<ul style="list-style-type: none"> ● Develop drawing skills for effective demonstration of building details. ● Draw building plans using Computer Aided Design and Drafting software's. ● Develop engineering project drawings incorporating details and design parameters in 2D & 3D. ● Examine efficacy of CAD design.
28	CEPCP 408	Fluid Mechanics and Hydraulic Machines Lab	2018	<ul style="list-style-type: none"> • Able to determine types of flow • Able to calibrate the flow measuring devices • Able to draw performance characteristic curves
29	CEESP 409	Materials Testing Lab	2018	1. acquire the knowledge and behavior in finding the properties of different materials.
30	CEPCT 501	Hydraulic Engineering	2018	<ol style="list-style-type: none"> 1. Able to find out drag and lift forces on submerged bodies 2. Able to analyze flow through pipes 3. Able to determine the economical sections 4. Able to classify the GVF profiles, RVF profiles and their characteristics
31	CEPET 502	Advanced Environmental Engineering	2018	<ol style="list-style-type: none"> 1. Able to characterize sludge and explain about different types of tertiary treatment of wastewater. 2. Able to explain about different methods of disposal of wastewater. 3. Able to explain about different types of air pollutants, its effects and controlling measures. 4. Able to apply measures for noise pollution 5. Able to manage Municipal Solid Waste.
32	CEPCT 503	Foundation Engineering	2018	<ul style="list-style-type: none"> ● Assess stability of slopes and Earth Pressures.

				<ul style="list-style-type: none"> ● Determine safe bearing capacity and settlement of shallow foundations. ● Calculate load carrying capacity of piles. ● Determine the well staining thickness
33	CEPET 504	Remote Sensing and GIS	2018	<ul style="list-style-type: none"> ● Comparing with ground, air and satellite based sensor platforms. ● Interpret the aerial photographs and satellite imageries. ● Create and input spatial data for GIS application. ● Apply RS and GIS concepts in water resources engineering. ● Applications of various satellite data.
34	CEPCT 505	Reinforced Concrete Design	2018	<ol style="list-style-type: none"> 1. Understand the basic concepts of working stress and limit state design methods 2. Design various RC elements like beams, columns, footings and slabs. 3. Apply design concepts to complex structural systems in advanced courses.
35	CEPCT 506	Design of Steel Structures	2018	<ol style="list-style-type: none"> a. Explain relevant IS codes b. Analysis and design of flexural members and detailing c. Design compression members of different types with connection detailing d. Design Plate Girder and Gantry Girder with connection detailing
36	CEPCP 507	Hydraulic Engineering Lab	2018	<ol style="list-style-type: none"> 1 Able to compute losses in pipe flow 2 Able to determine characteristics of gradually varied flow and hydraulic jump
37	CEPCP 508	Soil Mechanics Lab	2018	<ul style="list-style-type: none"> ● Identify various soils based on their characteristics. ● Evaluate permeability and seepage of soils. ● Determine plasticity characteristics of various soils.
38	CEPCT	Hydrology and Water	2018	<ol style="list-style-type: none"> 1. Able to calculate to mean precipitation

	601	Resources Engineering		<ol style="list-style-type: none"> 2. Able to prepare DAD and IDF curves 3. Able to develop flood hydrograph 4. able to compute flood magnitude and route of floods through reservoir and strems 5. Able to compute yield of well 6. To determine the irrigation water requirement and design of irrigation canals
39	CEPCT 602	Transportation Engineering	2018	<ol style="list-style-type: none"> 1. Estimate the requirements and design highway pavements. 2. Apprehend different components of Railways, Airports and Harbours.
40	CEOET 603	Open Elective – I	2018	<ul style="list-style-type: none"> • Understand various ingredients of concrete and their role. • Examine knowledge on the fresh and hardened properties of concrete. • Design concrete mixes using various methods. • Perceive special concretes for accomplishing performance levels.
41	CEPET 604	Programme Elective – III	2018	<ul style="list-style-type: none"> ● Choose appropriate soil exploration method ● Suggest suitable ground improvement methods. ● Design bracing systems and Sheet pile walls ● Design suitable foundations on expansive soils
42	CEPCP 606	Environmental Engineering Lab	2018	<ol style="list-style-type: none"> 1. Able to Perform common environmental experiments relating to water quality and wastewater characteristics 2. Able to Statistically analyze and interpret laboratory results 3. Demonstrate good written and oral communication

				skills
43	CEPCP 607	Transportation Engineering Lab	2018	1. Able to perform various tests for selection of various materials used in highway construction
44	MGHST 608	Management(Organizational Behaviour)	2018	1. Understand the Nature of Management; 2. Identify and Describe the Functions of Management; 3. Understand the Social Responsibilities of Business; and 4. Appreciate the Interests of Various Stakeholders in the Business.
45	CEPCT 701	Estimation & Costing	2018	<ul style="list-style-type: none"> ● Understand basics on methods and types of estimation. ● Formulate specifications and tender documents. ● Prepare contract agreements ● Determine rate analysis of different items. ● Valuation of buildings.
46	CEOET 702(a)	Watershed Management	2018	<ul style="list-style-type: none"> • Able to explain about Rainfall-Runoff analysis and estimation and design of storm • Able to do the effective watershed management methods and optimization • Able to understand about different soil conservation equations and principles • Able to apply the knowledge of water harvesting techniques and artificial recharge techniques
47	CEOET 702(b)	Environment Impact Assessment	2018	<ul style="list-style-type: none"> ● Prepare EMP, EIS, and EIA report. ● Identify the risks and impacts of a project.

				<ul style="list-style-type: none"> ● Choose an appropriate EIA methodology. ● Evaluation the EIA report. ● Estimate the cost benefit ratio of a project. <p>Know the role of stakeholder and public hearing in the preparation of EIA.</p>
48	CEHST 704	Professional Practice, Law & Ethics	2018	<ol style="list-style-type: none"> 1. To develop some ideas of the legal and practical aspects of their profession 2. To understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession.
49	CEPCI 705	Industry Internship	2018	<ol style="list-style-type: none"> 1. To enable the students to acquire practical knowledge. 2. Capable of carrying out Civil Engineering works in the field.
50	CEPCX 706	Project Work - Phase I	2018	<ol style="list-style-type: none"> 1. To enable the students to work in convenient group 2. Capable of doing a project involving theoretical and experimental studies. 3. Modern trend and technology in civil engineering
51	CEOET 801	Finite Element Methods	2018	<ul style="list-style-type: none"> ● Develop finite element formulations of 1D & 2D problems. ● Solve complex problems using FEM. ● Formulate isoparametric elements with different irregular boundaries. ● Implement solution techniques for higher order problems in practice. ● Apply concepts for carrying out research. ● Apply concepts for modelling of non-linear materials and geometry.

52	CEPET 802	Water Resources System Analysis	2018	<ul style="list-style-type: none"> ● Apply basic principles of system approach. ● Judging Economics of water resources of multipurpose projects. ● Apply optimization principles to single and multi crop applications. ● Designing reservoir operation leading to optimum crop water application.
53	CEPCX 803	Project Work - Phase II	2018	<ol style="list-style-type: none"> 1. To enable the students to work in convenient group 2. Capable of doing a project involving theoretical and experimental studies. 3. Modern trend and technology in civil engineering

Civil Engineering M.Tech (Structural Engineering)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	SEPC01	Advanced Structural Analysis	2018	<ol style="list-style-type: none"> 1. Analysis the structures due to the effects of settlements and temperature changes. 2. Analyze the skeleton structures using stiffness analysis code. 3. Use direct stiffness method understanding its limitations 4. Study the fundamentals of FEM
2	SEPC02	Advanced Solid Mechanics	2018	<ol style="list-style-type: none"> 1. Solve simple problems of elasticity and plasticity understanding the basic concepts. 2. Apply numerical methods to solve continuum problems. 3. Study the two-dimensional problems of Elasticity.

				<p>4. Solving the tensional problem of prismatic beam.</p> <p>5. Solve the problems of plasticity understanding the basic concepts.</p>
3	SEPE11	Theory of Thin Plates and Shells	2018	<p>1. Use analytical methods for the solution of thin plates and shells.</p> <p>2. Use analytical methods for the solution of shells.</p> <p>3. Apply the numerical techniques and tools for the complex problems in thin plates.</p> <p>4. Apply the numerical techniques and tools for the complex problems in shells.</p>
4	SECP01	Structural Design Lab	2018	<p>1. Design and Detail all the Structural Components of Frame Buildings.</p> <p>2. Design and Detail complete Multi-Storey Frame Buildings.</p>
5	SECP02	Advanced Solid Mechanics Lab	2018	<p>1. Diagnosis the distress in the structure understanding the causes and factors.</p> <p>2. Assess the health of structure using static field methods.</p> <p>3. Assess the health of structure using dynamic field tests.</p> <p>4. Suggest repairs and rehabilitation measures of the structure.</p>
6	PGPA12	Disaster Management	2018	<p>1. demonstrate a critical understanding of key</p>

				<p>concepts in disaster risk reduction and humanitarian response.</p> <p>2. critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.</p> <p>3. develop the standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.</p> <p>4. critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.</p>
7	PGPA41	Research Methodology and IPR	2018	<p>1. Understand research problem formulation.</p> <p>2. Analyze research related information</p> <p>3. Follow research ethics</p> <p>4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</p> <p>5. Understand that when IPR would take such important place in growth of individuals & Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.</p> <p>6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.</p>

8	SEPC03	FEM in Structural Engineering	2018	<ol style="list-style-type: none"> 1. Use Finite Element Method for structural analysis. 2. Execute the Finite Element Program/ Software. 3. Solve continuum problems using finite element analysis. 4. Develop the FEM software.
9	SEPC04	Structural Dynamics	2018	<ol style="list-style-type: none"> 1. Analyze and study dynamics response of single degree freedom system using fundamental theory and equation of motion. 2. Analyze and study dynamics response of Multi degree freedom system with lumped parameter using fundamental theory and equation of motion. 3. Analyze and study dynamics response of Multi degree freedom system with distributed man and load. 4. Study the concepts of dynamic effects due to wind loading, moving loading & vibrations caused by Traffic, Blasting & Pile driving. 5. Use the available software for dynamic analysis.
10	SEPE31	Advanced Steel Design	2018	<ol style="list-style-type: none"> 1. Analyse, design and detail Transmission/ TV tower, Mast and Trestles with different loading conditions. 2. Analyse, design and detail the RC and Steel Chimney. 3. Analyse. design and detail the tall buildings subjected to different loading conditions using relevant codes.

				4. Analysis and design of dynamic approach OF STRUCTURAL DESIGN USING is Code provisions.
11	SEPE32	Design of Formwork	2018	<p>2. Design deep beams and corbels</p> <p>3. Design of shear walls using IS, ACI & Errocode.</p> <p>4. Analyse the special structures by understanding their behaviour in torsional buckling.</p> <p>5. Design and prepare detail structural drawings for execution citing relevant IS codes.</p>
12	SECP03	Core Lab III Model Testing Lab	2018	<p>1. Plan the test set-up for model testing</p> <p>2. Understand the behavior of structural components.</p>
13	SECP04	Core Lab IV Numerical Analysis Lab	2018	<p>1 Find Roots of non-linear equations by Bisection method and Newton's method.</p> <p>2 Do curve fitting by least square approximations by using matlab</p> <p>3 Solve the system of Linear Equations using Gauss - Elimination/ Gauss - Seidal Iteration/ Gauss - Jorden Method</p> <p>4 To Integrate Numerically Using Trapezoidal and Simpson's Rules</p> <p>5 To Find Numerical Solution of Ordinary Differential Equations by Euler's Method, Runge- Kutta Method</p>

14	SEPE51	Design of Pre-stressed Concrete Structures	2018	<ol style="list-style-type: none"> 1. Find out losses in the pre-stressed concrete. Understand the basic aspects of pre-stressed concrete fundamentals, including pre and post-tensioning processes. 2. Analyse pre-stressed concrete deck slab and beam/girders. 3. Design pre-stressed concrete deck slab and beam/girders. 4. Design of end blocks for pre-stressed members.
15	SEPE52	Analysis of Laminated Composite Plates	2018	<ol style="list-style-type: none"> 1. To list out important legislations related to health, Safety and Environment. 2. To list out requirements mentioned in factories act for the prevention of accidents. 3. To understand the health and welfare provisions given in factories act.
16	SEOE12	Industrial Safety	2018	<ol style="list-style-type: none"> 1. To list out important legislations related to health, Safety and Environment. 2. To list out requirements mentioned in factories act for the prevention of accidents. 3. To understand the health and welfare provisions given in factories act.

Civil Engineering M.Tech (Geotechnical Engineering)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1	GTPC01	Advanced Soil Mechanics	2018	<ol style="list-style-type: none"> 1. The students obtain the complete knowledge on Strength and Compressibility of soil mass of soil mass. 2. To learn importance of stress paths on strength Characteristics. 3. The students are able to develop mathematical models for solving different problems in soil mechanics using critical state frame work.
2	GTPC02	Advanced Foundation Engineering	2018	<ol style="list-style-type: none"> 1. The students will be able to analyse and proportion shallow foundation. 2. To learn load transfer mechanisms and proportioning of deep foundations. 3. To comprehend design aspects of foundations in problematic soils 4. The students will be able to assess the type of foundations to be recommended for construction design of coffer dams.
3	GTPE11	Soil Structure Interaction	2018	<ol style="list-style-type: none"> 1. The student is exposed to soil foundation interaction behavior 2. The student learns analysis of structures using soils modeling soil as elastic half space and discretises springs. 3. The student will be able to analyse settlements and load distributions in piles and pile groups subjected to vertical and lateral loads.
4	GTPE12	Ground Improvement Techniques	2018	<ol style="list-style-type: none"> 1. Assess the site or ground conditions and judge for adopting ground improvement techniques for a particular structure and site conditions. 2. Select suitable compaction techniques or stabilization methods for improving engineering properties of soils in shallow layers.

				<p>3. To modify ground conditions by freezing and thermal methods.</p> <p>4. Select suitable reinforced earth methods for stabilizing soils in retaining walls and slopes.</p>
5	GTPE13	Pavement Analysis and Design	2018	<p>1. Assess the factors affecting the performance of pavements.</p> <p>2. Identifying failure criteria and design flexible and rigid pavements.</p> <p>3. Compare and select suitable pavement design approaches, overlays, and design aspects.</p>
6	GTPE22	Environmental Geotechnology	2018	<p>1. Students can understand Soil-environment interaction, Soil mineralogy and</p> <p>2. Mechanisms of soil-water interaction</p> <p>3. Students can learn ground water flow and predict contaminant transport phenomenon.</p> <p>4. Can apply remediation techniques for contaminated site.</p>
7	GTPE23	Critical State Soil Mechanics	2018	<p>1. Acquire fundamentals concept of Stresses and Strains and their states in soils.</p> <p>2. Comprehend the critical state line and the Roscoe surface.</p> <p>3. Gain knowledge on Cam-Clay model for analyzing the the plastic behaviour of soils before failure.</p> <p>4. Familiarize with the Development of constitutive laws for geotechnical materials including linear or nonlinear elastic (hyperbolic), linear elastic perfectly</p>

				plastic, and non-linear elastic-plastic models based on the Critical State Soil Mechanics theory.
8	GTCP01	Geotechnical Engineering Lab - 1	2018	<ol style="list-style-type: none"> 1. Determine all Index Properties for Cohesive and Cohesionless Soils 2. Determine Density Index for Cohesionless Soils. 3. Determine Compaction Characteristics for Cohesive Soils 4. Determine Permeability Characteristics for Cohesive and Cohesionless Soils.
9	GTCP02	Geotechnical Engineering Lab - 2	2018	<ol style="list-style-type: none"> 1. Determine Unconfined Compressive Stress for Cohesive Soils. 2. Determine shear parameter for Cohesionless Soils. 3. Determine Swelling Characteristics by different methods.
10	PGPC41	Research Methodology and IPR	2018	<ol style="list-style-type: none"> 1. Understand research problem formulation. 2. Analyze research related information 3. Follow research ethics 4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5. Understanding that when IPR would take such

				<p>important place in growth of individuals</p> <p>& Nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.</p>
11	GTPC0 3	Dynamics of soils and foundations	2018	<p>1. Students understands theory of vibration and resonance phenomenon, dynamic amplification</p> <p>2. Students understand propagation of body waves and surface waves through soil.</p> <p>3. Student exposed to different methods for estimation of dynamic soil properties required for design purpose.</p> <p>4. Students apply theory of vibrations to design machine foundation based on dynamic soil properties and bearing capacity.</p> <p>5. Students can predict dynamic bearing capacity and methods of vibration isolation.</p>
12	GTPC0 4	Subsurface investigations and instrumentation	2018	<p>1. Students can plan subsurface investigation based on the requirement of civil engineering project and site condition. Can finalize depth and number of boreholes</p> <p>2. Students can execute different subsurface exploration tests, collect Disturbed /</p> <p>undisturbed samples for laboratory tests and can suggest design parameters.</p> <p>3. Student exposed to different methods for estimation</p>

				<p>of soil properties required for design purpose.</p> <p>4. Students can develop instrumentation scheme for monitoring of critical sites</p>
13	GTPE31	Offshore Geotechnical Engineering / Marine Geotechniques	2018	<p>1. Physical and Engineering properties of marine soils and problems specific to marine soil deposits.</p> <p>2. Behavior of sands and clays under cyclic loading</p> <p>3. Site investigation in marine environment including Geophysical methods.</p> <p>4. Assess the factors governing the choice of the most suitable type of foundation for a given marine Structure.</p> <p>5. Select the type of foundation for a given marine Structure.</p>
14	GTPE32	Computational Geomechanics	2018	<p>1. Solution of linear equations</p> <p>2. Finite difference form of ordinary and partial differential equations</p> <p>3. Difference between correlation and regression analysis.</p> <p>4. Apply finite difference technique to solve complex consolidation and seepage problems in Geotechnical Engineering.</p>
15	GTPE33	3. Engineering rock mechanics	2018	<p>1. Assess the Physical and Mechanical properties of rocks.</p> <p>2. Adopt direct & indirect methods of rock exploration.</p> <p>3. Conduct different laboratory tests on rocks and analyse the results for rock properties</p>

				<p>4. Stress Strain behavior under Compressive, tension and Shear</p> <p>5. Strength criteria functions applied to Rocks.</p>
16	GTPE41	Earth Retaining Structures	2018	<p>1. Develop an understanding of the fundamental concepts that governs the behaviour of Earth and Earth Retaining Structures.</p> <p>2. Analyze and Design Retaining Walls,</p> <p>3. Analyze and Design Braced Cuts,</p> <p>4. Analyze and Design Shafts, Tunnels and Underground Conduits.</p>
17	GTPE42	Design of underground excavations	2018	<p>1. Students can plan exploration for various underground projects.</p> <p>2. Students can understand the use of elastic and plastic analysis in the design of underground support system.</p> <p>3. Students can classify rock masses and select suitable method for advising tunnels.</p> <p>4. Design of various tunnel support system.</p> <p>5. Students will have idea about the field tests generally conducted during and after construction of underground structures.</p>
18	GTPE43	Physical and Constitutive Modelling in Geomechanics	2018	<p>1. Stress strain models of elasticity of isotropic and anisotropic models.</p> <p>2. Students can understand theory of plasticity and</p>

				<p>various yield criteria and flow rule.</p> <p>3. Students can apply critical state concept to consolidation and triaxial soil behavior.</p> <p>4. Students can understand the application aspects of elastic plastic models.</p>
19	GTCP0 3	Sub soil exploration	2018	<p>1. Evaluate vertical and lateral extent of exploration; identify, select, and plan different stages of subsurface exploration for various civil engineering projects.</p> <p>2. Discriminate, Classify and analyses different techniques of exploration to be adopted in rocks and soils.</p> <p>3. Discriminate different types of soil samples, samplers and judge the appropriateness of a sample or sampler for practical cases accounting for the safety and economy.</p> <p>4. Evaluate different in-situ methods of tests to determine engineering properties of soils and locate Ground water table required for safe and economic design of foundations.</p> <p>5. Methods of planning, executing, implementing, interpreting, and reporting subsoil investigations based on geophysical methods</p>
20	GTCP0 4	Numerical Analysis Lab	2018	<p>1. Develop and Analysis of laboratory tests results using Spread sheets</p> <p>2. Develop and analysis of Spread sheets for stress distribution for different loading conditions.</p> <p>3. Determine Bearing Capacity of given soil sample.</p> <p>4. Able to determine settlements</p>
21	GTPE51	Stability analysis of slopes	2018	<p>1. Identifying types and causes of slope failures.</p>

				<p>2. Student will be able to check the stability of earthen dams</p> <p>3. The safety measures to be undertaken to prevent the instability of slopes, earthen dams and embankments.</p> <p>4. Understand maintenance and monitoring of slopes.</p>
22	GTPE52	Foundations on weak rocks	2018	<p>1. Understand Rock mass classification and its Engineering properties.</p> <p>2. Determine engineering properties of in-situ rocks and modes of failure associated.</p> <p>3. Assess allowable Bearing pressure.</p> <p>4. Design different types of foundations planned over rock mass.</p>
23	GTPE53	Geotechnical earthquake engineering	2018	<p>1. Students will know the causes and quantification of earthquake.</p> <p>2. Student will be exposed to the effect of earthquake and ground motion.</p> <p>3. Student will be able to understand Ground response analysis and Liquefaction effects.</p> <p>4. Student will be able to understand the seismic design of foundation</p>
24	GTOE11	Business Analytics	2018	<p>1. Students will demonstrate knowledge of data analytics.</p>

				<p>2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.</p> <p>3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.</p> <p>4. Students will demonstrate the ability to translate data into clear, actionable insights.</p>
25	GTOE12	Industrial Safety	2018	<p>1. Students will demonstrate knowledge of data analytics.</p> <p>2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.</p> <p>3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.</p> <p>4. Students will demonstrate the ability to translate data into clear, actionable insights.</p>
26	GTOE13	Operations Research	2018	<p>1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis</p> <p>4. Student should able to model the real world problem and simulate it.</p>
27	GTOE14	Cost Management of Engineering Projects	2018	<p>1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables.</p> <p>2. Students should able to apply the concept of non-</p>

				<p>linear programming</p> <p>3. Students should able to carry out sensitivity analysis</p> <p>4. Student should able to model the real world problem and simulate it.</p>
28	GTOE15	Composite Materials	2018	<p>1. Students should able to apply the dynamic programming to solve problems of discrete and Continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis Student should able to model the real world problem and simulate it</p>
29	GTOE16	Energy Generation from Waste	2018	<p>1. Students should able to apply the dynamic programming to solve problems of discrete and Continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis Student should able to model the real world problem and simulate it.</p>

Computer Science & Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MABST101	Mathematics I	2018	<p>1. analyze differential equations and solve them</p> <p>2. apply differential equations to engineering problems.</p> <p>3. use transformation to convert one type into another type presumably easier to solve.</p>

				<p>4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients.</p> <p>5. solve an initial value problem for an nth order ordinary differential equation using the Laplace transform.</p> <p>6. expand functions as power series using Maclaurin's and Talor's series</p> <p>7. optimize the problems related to OR, Computer science, Probability and Statistics</p> <p>8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc using curve tracingmethodto find length, area, volume.</p> <p>9. use multiple integral in evaluating area and volume of any region bounded by the given curves.</p>
	PYBST102	Modern Physics	2018	<ul style="list-style-type: none"> • Apply Cauchy's Theorem and Cauchy's Integral Formula□ • Compute logarithms and inverse trigonometric functions and calculate Taylor and Laurent series□ • Use complex analysis techniques such as the residue theorem to evaluate real integrals□ <ul style="list-style-type: none"> • Apply appropriate algorithms to solve selected problems, both manually and by writing computer programs.□ • Compare different algorithms with respect to

				accuracy and efficiency of solution.□ <ul style="list-style-type: none"> • Conduct numerical integration and differentiation.□
	ECPCT 402	Digital Electronics and Logic Design	2018	<ol style="list-style-type: none"> 1. Design and analyze combinational logic circuits 2. Design and analyze synchronous sequential logic circuits 3. Design and implement complicated digital systems using Verilog 4. Design a VLSI circuit for an application
	MEPCT 403	Simulation and Modeling	2018	<ul style="list-style-type: none"> • describe the components of continuous and discrete systems and simulate the same.□ • model any system from different fields.□ • discuss the simulation methods and select the suitable technique on the problems.□ • implement the model on the computer and from the results, check for the validity of the model and correctness of the assumptions present in the model.□ • understand the limitations of their model and nuances in computer modeling of systems.□
	CSPCT 404	Design and Analysis of Algorithms	2018	<ul style="list-style-type: none"> • Develop systematically an algorithm for solving a problem • Analyze the time and space complexity of the given algorithm • Identify algorithm design methodology to solve problems. • Distinguish between P and NP classes of problems
	CSPCT 405	Computer Organization	2018	<ul style="list-style-type: none"> • Identify the basic structure and functional units of a digital computer. • Analyze the effect of addressing modes on the execution time of a program. • Design processing unit using the concepts of hardwired control or microprogrammed control. • Select appropriate interfacing standards for I/O

				<p>devices.</p> <ul style="list-style-type: none"> • Identify the roles of various functional units of a computer in instruction execution. • Understand memory hierarchy and its impact on computer cost/performance. • Understand the advantage of instruction level parallelism and pipelining for high performance processor design.
	CSPCT 406	Database Management Systems	2018	<ul style="list-style-type: none"> • Use relational algebra and relational calculus, to express database queries. • Use SQL to interact with database management systems. • Design appropriate database tables, using functional dependencies and normal forms. • Implement a disk-oriented database storage manager with heap table and indexes. • Understand, compare, and implement the major concurrency control algorithms. • Implement database recovery algorithms and verify their correctness. • Identify trade-offs among database systems techniques and contrast distributed/parallel alternatives for both on-line transaction processing and on-line analytical workloads.
	CSPCT 501	Operating Systems	2018	<ol style="list-style-type: none"> 1. Recognize how the applications interact with the operating system as the latter working as intermediary program between the machine and the application. 2. Understand how operating system manages resources such as processors, memory and I/O. 3. Demonstrate knowledge and understanding of how concurrency in OS is handled. 4. Understand the techniques used to implement the process manager

				<p>5. Implement various memory management and demand paging techniques.</p> <p>6. Comprehend virtual memory abstractions in operating systems</p> <p>7. Design and develop file system interface.</p> <p>8. Understand various schemes available for achieving system protection and system security</p>
	CSPCT 502	Formal Languages and Automata Theory	2018	<ul style="list-style-type: none"> • Write a formal notation for strings, languages and machines. • Design finite automata to accept a set of strings of a language. • Determine whether the given language is regular or not. • Design context free grammars to generate strings of context free language. • Determine equivalence of languages accepted by pushdown automata and languages generated by context free grammars • Distinguish between computability & non-computability and decidability & undecidability.
	CSPCT 503	Software Engineering	2018	<ul style="list-style-type: none"> • Define and develop a software project from requirement gathering to implementation. • Obtain knowledge about principles and practices of software engineering. • Focus on the fundamentals of modeling a software project. • Obtain knowledge about estimation and maintenance of software systems <ul style="list-style-type: none"> • Comprehend, assess, and calculate the cost of risk involved in a project management

				<ul style="list-style-type: none"> • Implement testing methods at each phase of SDLC
	MEBST 506	Basics of Mechanical Engineering	2018	<ul style="list-style-type: none"> • Apply basic concepts of mathematics to formulate an optimization problem□ • Analyse and appreciate variety of performance measures for various optimization problems□ • Select appropriate solution technologies and strategies,□ • Interpret the solution of an optimization problem□ • Understand the effects of problem variation on the optimal solution.□
	CSPCP 507	Operating Systems Laboratory	2018	<ol style="list-style-type: none"> 1. Understand basics of thermodynamics and components of thermal plant 2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice. 3. Understand basics of heat transfer, refrigeration and internal combustion engines. 4. Understand mechanism of power transfer through belt, chain, rope and gear drives. 5. Understand functions and operations of machine tools including milling, grinding, and shaping machines.
	CSPCT 601	Principles of Programming Languages	2018	<ul style="list-style-type: none"> • Describe syntax and semantics of programming languages • Analyze the design issues involved in various constructs of programming languages • Explain data, data types, and basic statements of programming languages • Apply object-oriented, concurrency, and exception handling features of PLs. • Design and implement programs in Scheme, ML, and Prolog
	CSPCT 602	Computer Networks	2018	<ul style="list-style-type: none"> • Choose the transmission media depending on the requirements.

				<ul style="list-style-type: none"> • Explain the functions of different layer of the OSI Protocol • Analyze MAC layer protocols and LAN technologies • Implement routing and congestion control algorithms • Design new protocols for computer network. • Configure DNS, DDNS, TELNET, EMAIL, FTP, WWW, HTTP, SNMP, Bluetooth, Firewalls using open source software and tools.
	CSPCT 603	Language Processors	2018	<ul style="list-style-type: none"> • Design a compiler for a simple programming language • Understand phases in the design of compiler • Design top-down and bottom-up parsers • Develop syntax directed translation schemes • Comprehend and adapt to Lex and Yacc tools in compiler design
	CSPCT 604	Artificial intelligence	2018	<ul style="list-style-type: none"> • Demonstrate basic understanding of artificial intelligence and its fundamentals. • Identify a search algorithm for a problem and estimate its time and space complexities. • Possess the skill for representing knowledge using the appropriate technique for a given problem • Possess the ability to apply AI techniques to solve problems of game playing, expert systems, machine learning and robotics.
	CEEST 605	Basics of Civil Engineering	2018	<ul style="list-style-type: none"> • Find the suitability of various building materials at a particular location in the building construction. • Analyze the status of water quality standards for drinking and construction
	CSPCT 606	Cryptography	2018	<ul style="list-style-type: none"> • Understand the basic concepts of symmetric cryptosystem, public key cryptosystem and digital signature scheme • Reason about the security of cryptographic constructions

				<ul style="list-style-type: none"> • Break the cryptosystems that are not secure
	CSPET 701	Web and mobile technologies	2018	<ul style="list-style-type: none"> • Design and develop dynamic and interactive web sites.□ • Develop real world applications using client side and server side scripting languages□ • Design Android User Interface for mobile applications.□
	CSPET 702	Computer graphics	2018	<ul style="list-style-type: none"> • Understand the various computer graphics hardware and display technologies.□ • Implement various 2D and 3D objects transformation techniques.□ • Apply 2D and 3D viewing technologies into the real world applications□
	CSPEP 703	Soft computing	2018	<ul style="list-style-type: none"> • Comprehend the fuzzy logic and the concept of fuzziness involved in various systems.□ • Understand the role of soft computing techniques in solving real world applications□ • Build optimal classifiers using genetic algorithms□ • Implement fuzzy logic controller using MATLAB fuzzy logic toolbox□
	CSPEP 704	Cloud computing	2018	<ul style="list-style-type: none"> • Identify the architecture, service models and deployment models of Cloud.□ • Analyze authentication, confidentiality and privacy issues in Cloud computing environment.□ • Determine technological implications for selecting cloud computing platforms□ • Design and develop applications for Cloud environment
	CSPWP 705	Data mining	2018	<ul style="list-style-type: none"> • Comprehend the various architectures and its application with data mining□ • Design and develop data mining algorithms to analyze raw real world data□ • Apply preprocessing techniques for data cleansing□

				<ul style="list-style-type: none"> Analyze multi-dimensional modeling techniques and Classification & Clustering algorithms□
	CSINP 706	Software project management	2018	<ul style="list-style-type: none"> Describe the importance of project management from the perspectives of improving software economics.□ Describe software management process framework.□
	CSSEP 707	Big data analytics	2018	<ul style="list-style-type: none"> Understand big data challenges in different domains viz. social media, transportation, finance, medicine and apply the concepts of big data analytics for the said domains.□ Apply several newer algorithms for Clustering, Classifying and finding associations in Big Data□ Design and develop Hadoop and Map Reduce Framework□ Handle several Data Intensive tasks using the Map Reduce Paradigm□
	MEPCT 801	Cyber security	2018	<ul style="list-style-type: none"> Effectively use cyber security and computer forensics software/tools□ Measure the performance and troubleshoot cyber security systems.□ Protect the network from both internal and external attacks□ Provide new security solutions and and implement the same confidently.□
	COPCT 802	Image processing	2018	<ul style="list-style-type: none"> Understand Image representation and modeling.□ Design and apply image enhancement and restoration techniques□ Develop image processing techniques for assisting digital forensics□

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	CSCOT 01C	Data Structures and Algorithms	2018	<ol style="list-style-type: none"> 1. Acquire knowledge of various Methods and Notations for comparing the performance of various Data Structures. 2. Acquire knowledge of development of linear data structures like stacks, Queues and their operations, Implementation using Arrays and Linked Lists. 3. Acquire knowledge of properties of Binary Search Trees and balanced binary search trees. 4. Acquire knowledge of Hashing, String Searching Algorithms and their implementation
	CSCOT 02C	Advanced topics in Database Management Systems	2018	<ol style="list-style-type: none"> 1. Acquire knowledge to Develop skills to design and analyze of logical and Physical databases 2. Acquire knowledge to Parallel and Distributed Databases. 3. Acquire knowledge to Data Warehousing and Decision Support. 4. Acquire knowledge to Information Retrieval and XML Data
	CSCOT 03C	Cryptography & Network Security	2018	<ol style="list-style-type: none"> 1. Acquire the knowledge of develop Traditional Symmetric-Key Ciphers 2. Acquire the knowledge of develop Modern Symmetric-Key Ciphers. 3. Acquire the knowledge of develop Encipherment Using Modern Symmetric-Key Ciphers. 4. Acquire the knowledge of develop Message Integrity, Random Oracle model, Message Authentication. Cryptographic Hash Functions. 5. Acquire the knowledge of develop Network Security
	CSCOT 07E	Machine Learning	2018	<ol style="list-style-type: none"> 1. Acquire knowledge to develop Machine Learning Applications. 2. Acquire knowledge to develop Multivariate Methods.

				<ol style="list-style-type: none"> 3. Acquire knowledge to develop Nonparametric Methods. 4. Acquire knowledge to develop Kernel Machines. 5. Acquire knowledge to Design and Analysis of Machine Learning Experiments
	CSCOT 08E	Research Methodology	2018	<ol style="list-style-type: none"> 1. Acquire knowledge to Develop Performance Evaluation of a Computer-based System. 2. Acquire knowledge to Develop Probability Distributions. 3. Acquire knowledge to Develop Statistical Inference. 4. Acquire knowledge to Develop Optimization Problems. 5. Acquire knowledge to Design and Analysis of simulation models
	CSCOT 09E	Internet of Things	2018	<ol style="list-style-type: none"> 1. Acquire knowledge to Develop Internet of Things. 2. Acquire knowledge to Develop IoT System Management with NETCONF-YANG. 3. Acquire knowledge to Develop IoT Physical Devices & Endpoints. 4. Acquire knowledge to Develop IoT Design: Home Automation. 5. Design and Analysis of Data Analytics for IoT
	CSCOTP 01	Core –I Laboratory	2018	<ol style="list-style-type: none"> 1. Acquire knowledge to develop Machine Learning Applications. 2. Acquire knowledge to develop Multivariate Methods. 3. Acquire knowledge to develop Nonparametric Methods. 4. Acquire knowledge to develop Kernel Machines. 5. Acquire knowledge to Design and Analysis of Machine Learning Experiments 6. Acquire knowledge to Develop Probability

				<p>Distributions.</p> <ol style="list-style-type: none"> 7. Acquire knowledge to Develop Statistical Inference. 8. Acquire knowledge to Develop Optimization Problems. 9. Acquire knowledge to Design and Analysis of simulation models 10. Acquire knowledge to Develop IoT Physical Devices & Endpoints. 11. Acquire knowledge to Develop IoT Design: Home Automation. 12. Design and Analysis of Data Analytics for IoT
	CSCOP 02	Elective-I Laboratory	2018	<ol style="list-style-type: none"> 1. Develop Machine Learning Applications. 2. Develop Multivariate Methods. 3. Develop Nonparametric Methods. 4. Develop Kernel Machines. 5. Develop Design and Analysis of Machine Learning Experiments. 6. Develop Probability Distributions. 7. Develop Statistical Inference. 8. Develop Optimization Problems. 9. Design and Analysis of simulation models 10. Develop IoT Physical Devices & Endpoints. 11. Develop IoT Design: Home Automation. 12. Design and Analysis of Data Analytics for IoT.
	CSCOT 04C	Advances in Artificial Intelligence	2018	<ol style="list-style-type: none"> 1. Acquire knowledge of State-Space Search. 2. Acquire knowledge of Game playing algorithms. 3. Acquire knowledge of Genetic Algorithms and Neural networks. 4. Acquire knowledge of Robotic Control Systems. 5. Acquire knowledge of Deep learning – Convolution networks
	CSCOT 05C	Topics in Operating Systems	2018	<ol style="list-style-type: none"> 1. Acquire knowledge of CPU scheduling algorithms.

				<ol style="list-style-type: none"> 2. Acquire knowledge of , File system implementation. 3. Acquire knowledge of Distributed Systems . 4. Acquire knowledge of internals of - Linux Operating System. 5. Acquire knowledge of Internals of - MAC Operating System.
	CSCOT 06C	Distributed and Cloud Computing	2018	<ol style="list-style-type: none"> 1. Acquire knowledge of Distributed System Models. 2. Acquire knowledge of Virtual Machines and Virtualization of Clusters. 3. Acquire knowledge of Service-Oriented Architectures. 4. Acquire knowledge of Cloud Programming. 5. Acquire knowledge of Peer-to-Peer Computing Systems.
	CSCOT 10E	Artificial Neural Networks (Open Elective, other Branches)	2018	<ol style="list-style-type: none"> 1. Acquire knowledge of Pattern recognition methods. 2. Acquire knowledge of Functional Units of ANNs for Pattern Recognition Tasks. 3. Acquire knowledge of Feed-back Neural Networks. 4. Acquire knowledge of Competitive Learning Neural Networks. 5. Acquire knowledge of Applications of ANNs.
	CSCOT E11	Big Data Analytics	2018	<ol style="list-style-type: none"> 1. Acquire knowledge of Statistical Limits on Data Mining. 2. Acquire knowledge of Applications of Near-Neighbor Search. 3. Acquire knowledge of A-Priori Algorithm. 4. Acquire knowledge of On-Line Algorithms. 5. Acquire knowledge of Mining Social-Network Graphs.
	CSCOT 12E	Cyber Security	2018	Acquire knowledge of Building a Secure Organization,

				<p>Preventing System Intrusions. Acquire knowledge of Wireless Network Security. Acquire knowledge of Intrusion Prevention and Detection Systems. Acquire knowledge of Virtual Private Networks. Acquire knowledge of Biometrics.</p>
	CSCOP 03	Core-II Laboratory	2018	<ol style="list-style-type: none"> 1. Acquire knowledge of State-Space Search. 2. Acquire knowledge of Game playing algorithms. 3. Acquire knowledge of Genetic Algorithms and Neural networks. 4. Acquire knowledge of Deep learning –Convolution networks 5. Acquire knowledge of CPU scheduling algorithms. 6. Acquire knowledge of , File system implementation. 7. Acquire knowledge of Distributed Systems . 8. Acquire knowledge of internals of - Linux Operating System. 9. Acquire knowledge of Internals of - MAC Operating System. 10. Acquire knowledge of Distributed System Models. 11. Acquire knowledge of Cloud Programming. 12. Acquire knowledge of Peer-to-Peer Computing Systems.
	CSCOP 04	Elective –II Laboratory	2018	<ol style="list-style-type: none"> 1. Acquire knowledge of Statistical Limits on Data Mining. 2. Acquire knowledge of Applications of Near-Neighbor Search. 3. Acquire knowledge of A-Priori Algorithm. 4. Acquire knowledge of On-Line Algorithms. 5. Acquire knowledge of Mining Social-Network Graphs 6. Acquire knowledge of Building a Secure Organization, Preventing System Intrusions.

				<p>7. Acquire knowledge of Wireless Network Security.</p> <p>8. Acquire knowledge of Intrusion Prevention and Detection Systems.</p> <p>9. Acquire knowledge of Virtual Private Networks.</p> <p>10. Acquire knowledge of Biometrics.</p> <p>Acquire knowledge of Experiments from Elective From other branch</p>
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Electronics & Communication Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	MABST 101	Mathematics–I	2018	<p>1. analyzedifferential equations and solvethem</p> <p>2. applydifferential equationstoengineeringproblems.</p> <p>3. use transformationto convertone type intoanother typepresumably easiertosolve.</p> <p>4. useshifttheoremstocomputetheLaplacetransform,inverseLaplacetransformandthesolutionsof secondorder, linearequationswith constantcoefficients.</p> <p>5. solveaninitialvalueproblemforannthorderordinarydifferentialequationusingtheLaplacetransform.</p> <p>6. expandfunctionsaspowerseriesusingMaclaurin’sandTalo r’sseries</p> <p>7. optimizetheproblemsrelatedtoOR,Computerscience,ProbabilityandStatistics</p>
	PYBST 102	Modern Physics	2018	<p>1. develop appropriate competence and working knowledge of laws of modern Physics</p>

				<p>in understanding advanced technical engineering courses</p> <p>2. understand the quantum mechanics and ultimately the quantum behavior of charged particles when they are in motion.</p> <p>3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems</p> <p>4. apply knowledge of band theory in the area of electronics and understanding the basic electron transportation phenomenon in micro devices.</p> <p>5. understand the principles in electrostatics and electromagnetics and magnetic properties of materials.</p> <p>6. understand size dependent properties of nanodimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices.</p> <p>7. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.</p> <p>8. learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.</p> <p>9. provide multidisciplinary experiences throughout the curriculum.</p>
	CSEST 103	Programming for Problem Solving	2018	
	ECEST 104	Electronic Devices	2018	<p>1. understand the principles of semiconductor physics of the intrinsic, p and n type materials.</p>

				<ol style="list-style-type: none"> 2. understand the characteristics of the diode and some special function diodes and their application in electronic circuits. 3. use mathematics to analyze electronic devices typical of those in switching and rectifier circuits. 4. understand and utilize the mathematical model of semiconductor junctions and transistors for circuits and systems. 5. understand the characteristics of the Transistors and opto-electronic devices and their application in electronic circuits. 6. apply thyristors in power switching and control circuits.
	MEESP 105	Workshop/Manufacturing Practices	2018	Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.
	CSESP 106	Programming for Problem Solving Lab	2018	<ol style="list-style-type: none"> 1. formulate simple algorithms for arithmetic and logical problems. 2. translate the algorithms to programs (in C language). 3. test and execute the programs and correct syntax and logical errors. 4. implement conditional branching, iteration and recursion. 5. decompose a problem into functions and synthesize a complete program using divide and conquer approach. 6. use arrays, pointers and structures to formulate algorithms and programs. 7. apply programming to solve matrix addition and multiplication problems and searching and sorting

				<p>problems. and to apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration</p>
	CEACT 107	Environmental Science	2018	<p>1. acquire knowledge in <ul style="list-style-type: none"> • diverse components of environment and natural resources • ecosystem and biodiversity & its conservation methods • population growth and human health • green technology </p> <p>2. identify and resolve the issues related to sources of different types of pollutions</p> <p>3. provides solution to individuals, industries and government for sustainable development of natural resources apply environmental ethics in protection of diversified ecosystems.</p>
	MABST 201	Mathematics–II	2018	<p>1. use rank of matrices to decide whether the system of linear equations is consistent or not</p> <p>2. use Cayley-Hamilton theorem to find inverses or powers of matrices.</p> <p>3. use Eigen values and vector to reduce Quadratic form to normal form.</p> <p>4. to analyze motion problems from real lines to curves and surfaces in 3-D and use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. use Green's theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. use Stokes' theorem to give a physical interpretation of the curl of a vector field</p>

				7. use the divergence theorem to give a physical interpretation of the divergence of a vector field
	CYBST 202	Engineering Chemistry	2018	<ol style="list-style-type: none"> 1. analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. 2. rationalise bulk properties and processes using thermodynamic considerations. 3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques 4. rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. 5. list major chemical reactions that are used in the synthesis of molecules.
	HSENT 203	English	2018	<ol style="list-style-type: none"> 1. learn the elements of grammar and composition of English Language. 2. Learn literary texts such as Short stories and prose passages
	EEEST 204	Basic Electrical Engineering	2018	<ol style="list-style-type: none"> 1. understand and analyze basic electric and magnetic circuits. 2. study the working principles of electrical machines and power converters. 3. introduce the components of low-voltage electrical installations.
	MEEEST 205	Engineering Graphics & Design	2018	<ol style="list-style-type: none"> 1. make a distinction between first angle projection and third angle projection of drawing. 2. draw hyperbola, parabola, involutes and Cycloidal curves. 3. draw sections of solids including cylinders, cones, prisms and pyramids. 4.

				draw projectionsof lines, planes, solids and sections of solids. 5. draw orthographic projections of lines, planes, and solids.
	HSENP 206	English Communications Lab	2018	The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
	MABST30 1	Mathematics-III	2018	<ol style="list-style-type: none"> 1. Solve field problems in Vector Analysis and Numerical Methods 2. Solve field problems in engineering involving PDEs. 3. They can also formulate and solve problems involving random variables and apply statistical methods for analysing experimental data. 4. They can formulate and solve problems Test of significance.
	EEPCT30 2	Network Theory	2018	<ol style="list-style-type: none"> 1. Understand basics electrical circuits with nodal and mesh analysis. 2. Appreciate electrical network theorems. 3. Apply Laplace Transform for steady state and transient analysis. 4. Determine different network functions. 5. Appreciate the frequency domain techniques.
	ECPCT30 3	Electromagnetic Waves	2018	<ol style="list-style-type: none"> 1. Understand characteristics and wave propagation on high frequency transmission lines. 2. Carry out impedance transformation on transmission lines. 3. Use sections of transmission line sections for realizing circuit elements 4. Characterize uniform plane wave. 5. Calculate reflection and transmission of waves at media interface. 6. Analyze wave propagation on metallic waveguides in

				modal form. 7. Understand principle of radiation and radiation characteristics of an antenna
	HSMCT30 5	Economics	2018	<ol style="list-style-type: none"> 1. Design and analyze combinational logic circuits. 2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder. 3. Design & analyze synchronous sequential logic circuits. 4. Use HDL & appropriate EDA tools for digital logic design and simulation.
	ECPCP30 7	Electronic Devices Lab	2018	<ol style="list-style-type: none"> 1. Get an exposure to common electrical components and their ratings. 2. Make electrical connections by wires of appropriate ratings. 3. Understand the usage of common electrical measuring instruments. 4. Understand the basic characteristics of transformers and electrical machines. 5. Get an exposure to the working of power electronic converters.
	ECPCP30 8	Digital System Design Lab	2018	<ol style="list-style-type: none"> 1. To gain introduction to managerial economics and demand analysis 2. To estimate Cost Analysis Production and Supply Analysis 3. To understand Price and Output Decisions Under Different Market Structures 4. To be able to analyze Profit Management
	EEESP 309	Basic Electrical Engineering Lab	2018	<ol style="list-style-type: none"> 1. To gain knowledge in to managerial Accounting, and Financial Statement Analyses 2. To be able to know the methods of Depreciation 3. To gain Knowledge in Capital Budgeting 4. To get expertise in Marginal Costing
	HSACT31	Constitution of India	2018	<ol style="list-style-type: none"> 1. Understand the premises informing the twin themes

	0			<p>of liberty and freedom from a civil rights perspective.</p> <p>2. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.</p> <p>3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.</p>
	ECPCT40 1	Analog Circuits	2018	<p>1. Understand the characteristics of diodes and transistors.</p> <p>2. Design and analyze various rectifier and amplifier circuits.</p> <p>3. Design sinusoidal and non-sinusoidal oscillators.</p> <p>4. Understand the functioning of OP-AMP and design OP-AMP based circuits.</p> <p>5. Design ADC and DAC</p>
	ECPCT40 2	Signals and Systems	2018	
	ECPCT40 3	Probability Theory and Stochastic Processes	2018	<p>1. Analyze and compare different analog modulation schemes for their efficiency and bandwidth</p> <p>2. Analyze the behavior of a communication system in presence of noise.</p> <p>3. Investigate pulsed modulation / band pass modulation system and analyze their system performance.</p> <p>4. Analyze different digital modulation schemes and can compute the bit error performance.</p>
	CSPCT40 5	Computer Organization and Architecture	2018	<p>1. Analyze different types of signals</p> <p>2. Understand the concepts of continuous time and discrete time systems.</p> <p>3. Analyse systems in complex frequency domain.</p>

				<ol style="list-style-type: none"> 4. Investigate whether the system is stable or not. 5. Understand sampling theorem and its implications.
	HSMCT40 6	Management Science	2018	<ol style="list-style-type: none"> 1. Work more creatively, work in groups 2. Presenting ideas more effectively and efficiently in formal and informal ways. 3. Development of fundamental rethinking and radical redesign in the organizations. 4. Applying the ideas of the course to identifying and solving real world problems. 5. Development of Group Dynamic Skills
	EEPCT50 1	Linear Control Systems	2018	<p>Pharacterize a system and find its study state behavior. Investigate stability of a system its assessment for linear-time invariant systems using different tests. Design various simple feedback controllers. Understand the modeling of linear-time-invariant systems using transfer function and state-space representations. Solve liner, non-liner and optimal control problems.</p>
	ECPCT50 2	IC Applications	2018	<ol style="list-style-type: none"> 1: Understand the operation of analog electronic circuit systems and their components. 2:demonstrate the use of analog circuit analysis techniques to analyze the operation and behavior of various analog integrated circuits. 3: design differential amplifier using operational amplifier 4: analyze stability of operational design differential amplifier using operational amplifier amplifiers 5: Apply frequency compensation techniques for amplifiers 6: design the different waveform generators using operational amplifiers. 7: design linear applications circuits such as summer,

				<p>integrator, and differentiator etc using op-amplifiers.</p> <p>8: design circuits such as log, comparator and multiplier etc using operational amplifiers</p>
	ECPCT504	Digital Signal Processing	2018	<ol style="list-style-type: none"> 1. Do assembly language programming. 2. Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc. 3. Develop systems using different microcontrollers. 4. Understand RSIC processors and design ARM microcontroller based systems
	ECPET505	Electronic Measurements	2018	<ol style="list-style-type: none"> 1: demonstrate the importance of various errors in the measurement process. 2: design of various devices like DC Ammeter and DC voltmeters using PMMC, ohmmeters. 3: demonstrate internal structure, working and design of various electronic devices like true RMS responding voltmeters, AC voltmeters. 4: demonstrate internal structure, working and design of various subsystems in CRO. 5: design electrostatic deflection systems. 6: understand the working principles of special purpose oscilloscopes. 7: design different electronic devices like Multimeters and Q-meters, etc. 8: design DC and AC bridges.

				<p>9: understand audio & radio frequency wave analyzers and spectrum analyzers.</p> <p>10: understand the working of different Digital voltmeters.</p> <p>11: understand the working of different digital instruments like universal counter, tachometers etc.</p> <p>12:select a transducer for measurement of various physical parameters like displacement, pressure, temperature, strain etc.</p>
	ECPCP510	Digital Signal Processing Lab	2018	<ol style="list-style-type: none"> 1. Represent signals mathematically in continuous and discrete time and frequency domain. 2. Get the response of an LSI system to different signals. 3. Design of different types of digital filters for various applications.
	ECPCT601	Computer Networks	2018	<ol style="list-style-type: none"> 1. Understand the concepts of networking thoroughly. 2. Design a network for a particular application. 3. Analyze the performance of the network.
	ECPCP608	Electronic Measurements Lab	2018	<p>Design and validate DC and AC bridges</p> <p>Analyze the dynamic response and the calibration of few instruments</p> <p>Learn about various measurement devices, their characteristics, their operation and their limitations</p> <p>Understand statistical data analysis</p> <p>Understand computerized data acquisition.</p>
	ECPXP609	Electronic Design Workshop / Mini Project	2018	<p>Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.</p> <p>Design, implement and test the prototype/algorithm in order to solve the conceived problem. Write comprehensive report on mini project work.</p>

Electronics & Communication Engineering M.Tech (Communication System)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	CSPC 01	Advanced Digital Signal Processing (Common to Signal Processing SPPC01)	2018	<p>To understand theory of different filters and algorithms</p> <p>To understand theory of multirate DSP, solve numerical problems and write algorithms</p> <p>To understand theory of prediction and solution of normal equations</p> <p>To know applications of DSP at block level</p>
	CSPC 02	Wireless and Mobile Communication	2018	<p>Design appropriate mobile communication systems</p> <p>Apply frequency-reuse concept in mobile communications, and to analyze its effects on interference, system capacity, handoff techniques</p> <p>Distinguish various multiple-access techniques for mobile communications e.g. FDMA, TDMA, CDMA, and their advantages and disadvantages.</p> <p>Analyze path loss and interference for wireless telephony and their influences on a mobile-communication system's performance.</p> <p>Analyze and design CDMA system functioning with knowledge of forward and reverse channel details, advantages and disadvantages of using the technology</p> <p>Understanding upcoming technologies like 3G, 4G etc.</p>
	CSPE 11	DSP Architecture(Common to Signal Processing SPPE11)	2018	<p>Identify and formalize architectural level characterization of P-DSP hardware</p> <p>Ability to design, programming (assembly and C), and testing code using Code Composer Studio environment</p> <p>Deployment of DSP hardware for Control, Audio and Video Signal processing applications</p>

				Understanding of major areas and challenges in DSP based embedded systems
	CSPE 12	Optical Networks	2018	Contribute in the areas of optical network and WDM network design Implement simple optical network and understand further technology developments for future enhanced network.
	CSPE 13	Statistical Information Processing	2018	Characterize and apply probabilistic techniques in modern decision systems, such as information systems, receivers, filtering and statistical operations Demonstrate mathematical modelling and problem solving using such models Comparatively evolve key results developed in this course for applications to signal processing, communications systems. Develop frameworks based in probabilistic and stochastic themes for modelling and analysis of various systems involving functionalities in decision making, statistical inference, estimation and detection.
	CSPE 21	Cognitive Radio	2018	Understand the fundamental concepts of cognitive radio networks. Develop the cognitive radio, as well as techniques for spectrum holes detection that cognitive radio takes advantages in order to exploit it. Understand technologies to allow an efficient use of TVWS for radio communications based on two spectrum sharing business models/policies
	CSPE 22	Voice and Data Networks (Common to Signal Processing SPPE22)	2018	Protocol, algorithms, trade-offs rationale Routing, transport, DNS resolutions Network extensions and next generation architectures.
	CSPE 23	Wireless sensor Networks	2018	Design wireless sensor network system for different

				<p>applications under consideration</p> <p>Understand the hardware details of different types of sensors and select right type of sensor for various applications.</p> <p>Understand radio standards and communication protocols to be used for wireless sensor network based systems and application.</p> <p>Use operating systems and programming languages for wireless sensor nodes, performance of wireless sensor networks systems and platforms</p> <p>Handle special issues related to sensors like energy conservation and security challenges</p>
	CSCP 01	Advanced Digital Signal Processing Lab (Common to Signal Processing SPCP01)	2018	<p>Design different digital filters in software</p> <p>Apply various transforms in time and frequency</p> <p>Perform decimation and interpolation</p>
	CSCP 02	Wireless and Mobile Communication Lab	2018	<p>Understanding Cellular concepts, GSM and CDMA networks</p> <p>To study GSM handset by experimentation and fault insertion techniques</p> <p>Understating of 3G communication system by means of various AT commands</p> <p>usage in GSM</p> <p>Understanding CDMA concept using DSSS kit</p> <p>To learn, understand and develop concepts of Software Radio in real time environment</p>
	PGMC 01	Research Methodology and IPR	2018	<ol style="list-style-type: none"> 1. understand research problem formulation. 2. analyze research related information 3. follow research ethics 4. understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept,

				<p>and creativity.</p> <p>5.understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.</p> <p>6.understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.</p>
	PGPA11	English and Research Paper Writing	2018	
	PGPA12	Disaster Management	2018	
	PGPA13	Sanskrit for Technical Knowledge	2018	<ol style="list-style-type: none"> 1. Understanding basic Sanskrit language 2. Ancient Sanskrit literature about science & technology can be understood 3. Being a logical language will help to develop logic in students
	PGPA14	Value Education	2018	<ol style="list-style-type: none"> 1.Knowledge of self-development 2.Learn the importance of Human values 3.Developing the overall personality
	CSPC 03	Antennas and Radiating Systems	2018	<ol style="list-style-type: none"> 1. Compute the far field distance, radiation pattern and gain of an antenna for given current distribution 2. Estimate the input impedance, efficiency and ease of match for antennas 3. Compute the array factor for an array of identical antennas. 4. Design antennas and antenna arrays for various desired radiation pattern characteristics.
	CSPC 04	Advanced Communication Networks	2018	Understand advanced concepts in Communication Networking

				<p>Design and develop protocols for Communication Networks.</p> <p>Understand the mechanisms in Quality of Service in networking.</p> <p>Optimise the Network Design</p>
	CSPE 31	Satellite Communication	2018	<ul style="list-style-type: none"> • Visualize the architecture of satellite systems as a means of high speed, high range communication system. • State various aspects related to satellite systems such as orbital equations, sub- systems in a satellite, link budget, modulation and multiple access schemes. • Solve numerical problems related to orbital motion and design of link budget for the given parameters and conditions.
	CSPE 32	IOT and Applications (Common to Signal Processing SPPE32)	2018	<p>Understand the concept of IOT and M2M</p> <p>Study IOT architecture and applications in various fields</p> <p>Study the security and privacy issues in IOT.</p>
	CSPE 33	RF and Microwave Circuit Design	2018	<p>Understand the behavior of RF passive components and model active components.</p> <p>Perform transmission line analysis</p> <p>Demonstrate use of Smith Chart for high frequency circuit design.</p> <p>Justify the choice/selection of components from the design aspects.</p> <p>Contribute in the areas of RF circuit design.</p>
	CSPE 41	Markov chain and Queuing System	2018	<ul style="list-style-type: none"> • Understand Markov Chains and regenerative processes used in modelling a wide variety of systems and phenomena • Model a system as queuing system with some aspect of the queue governed by a random process. • Understand telecommunication systems modelling using Markov chains with special emphasis

				on developing queuing models.
	CSPE 42	Pattern recognition and Machine Learning (Common to Signal Processing SPPC03)	2018	<p>1 Study the parametric and linear models for classification</p> <p>2 Design neural network and SVM for classification</p> <p>3 Develop machine independent and unsupervised learning techniques.</p>
	CSPE 43	Programmable networks- SDN,NFV	2018	<p>Understand advanced concepts in Programmable Networks.</p> <p>Understand Software Defined Networking, an emerging Internet architectural framework.</p> <p>Implement the main concepts, architectures, algorithms, protocols and applications in SDN and NFV.</p>
	CSCP 03	Antennas and Radiating Systems Lab	2018	<p>Determine specifications, design, construct and test antenna.</p> <p>Explore and use tools for designing, analyzing and testing antennas. These tools include Antenna design and analysis software, network analyzers, spectrum analyzers, and antenna pattern measurement techniques.</p>
	CSCP 04	Advanced Communication Networks Lab	2018	<p>Identify the different types of network devices and their functions within a network.</p> <p>Understand and build the skills of sub-netting and routing mechanisms.</p> <p>Understand basic protocols of computer networks, and how they can be used to assist in network design and implementation.</p>
	PGPA21	Constitution of India	2018	<p>1. the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.</p>

				<p>2. the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</p> <p>3. the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</p> <p>4. the passage of the Hindu Code Bill of 1956</p>
	PGPA22	Pedagogy Studies	2018	<p>1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</p> <p>2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</p> <p>3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</p>
	PGPA23	Stress Management by Yoga	2018	<p>1. Develop healthy mind in a healthy body thus improving social health also</p> <p>2. Improve efficiency</p>
	PGPA24	Personality Development through Life Enlightenment Skills	2018	<p>1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life</p> <p>2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity</p> <p>3. Study of Neetishatakam will help in developing versatile personality of students</p>
	CSMP 01	Mini Project with seminar	2018	<p>Understand of contemporary / emerging technology for various processes and systems</p> <p>Share knowledge effectively in oral and written form and formulate documents.</p>

	CSPE 51	Remote Sensing (Common to Signal Processing SPPE51)	2018	Understand basic concepts, principles and applications of remote sensing, particularly the geometric and radiometric principles Provide examples of applications of principles to a variety of topics in remote sensing, particularly related to data collection, radiation, resolution, and sampling.
	CSPE 52	High Performance Networks	2018	Apply knowledge of mathematics, probability, and statistics to model and analyze some networking protocols. Design, implement, and analyze computer networks. Identify, formulate, and solve network engineering problems Show knowledge of contemporary issues in high performance computer networks. Use techniques, skills, and modern networking tools necessary for engineering practice
	CSPE 53	MIMO Systems	2018	Understand channel modelling and propagation, MIMO Capacity, space-time coding MIMO receivers, MIMO for multi-carrier systems (e.g. MIMO-OFDM), multi-user communications, multi-user MIMO. Understand cooperative and coordinated multi-cell MIMO, introduction to MIMO in 4G (LTE, LTE-Advanced, WiMAX). Perform Mathematical modelling and analysis of MIMO systems.
	PGOE 11	Business Analytics	2018	1. knowledge of data analytics. 2. the ability of think critically in making decisions based on data and deep analytics. 3. the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. the ability to translate data into clear, actionable

				insights.
	PGOE 13	Operation Research	2018	<ol style="list-style-type: none"> 1. apply the dynamic programming to solve problems of discrete and continuous variables. 2. apply the concept of non-linear programming 3. carry out sensitivity analysis 4. model the real world problem and simulate it.
	PGOE 14	Cost Management of Engineering Projects	2018	
	PGOE 15	Composite Materials	2018	
	PGOE 16	Waste to Energy	2018	
	CSPD 01	Dissertation Phase-I	2018	<ul style="list-style-type: none"> • Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem. • Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design. • Ability to present the findings of their technical solution in a written report. • Presenting the work in International/ National conference or reputed journals.

Electronics & Communication Engineering M.Tech (Signal Processing)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	SPPC 01	Advanced Digital Signal Processing	2018	To understand theory of different filters and algorithms To understand theory of multirate DSP, solve numerical problems and write algorithms To understand theory of prediction and solution of normal equations To know applications of DSP at block level
	SPPC 02	Digital Image Video Processing	2018	<ul style="list-style-type: none"> • Learn different techniques for image enhancement,

				<p>video and image recovery</p> <ul style="list-style-type: none"> • Understand techniques for image and video segmentation • Study techniques for image and video compression and object recognition
	SPPE 11	DSP Architecture	2018	<p>Identify and formalize architectural level characterization of P-DSP hardware</p> <p>Ability to design, programming (assembly and C), and testing code using Code Composer Studio environment</p> <p>Deployment of DSP hardware for Control, Audio and Video Signal processing applications</p> <p>Understanding of major areas and challenges in DSP based embedded systems</p>
	SPPE 12	Computer Vision	2018	<p>Study the image formation models and feature extraction for computer vision</p> <p>Identify the segmentation and motion detection and estimation techniques</p> <p>Develop small applications and detect the objects in various applications</p>
	SPPE 13	Artificial Intelligence	2018	
	SPPE 21	Joint time frequency analysis and multiresolution analysis(JTFA and MRA)	2018	<ul style="list-style-type: none"> • Introduction to Transforms in signal processing • To understand Time -Frequency Analysis & Multiresolution • Analysis Study of Wavelets and its Applications
	SPPE 22	Voice and Data Networks	2018	<p>Protocol, algorithms, trade-offs rationale</p> <p>Routing, transport, DNS resolutions</p> <p>Network extensions and next generation architectures.</p>
	SPPE 23	Audio Video Coding & Compression	2018	<ul style="list-style-type: none"> • Familiarity to lossy and lossless compression systems. • Study of Video coding techniques and standards. • Understand audio coding and multimedia

				synchronization techniques.
	SPCP 01	Advanced Digital Signal Processing Lab	2018	Design different digital filters in software Apply various transforms in time and frequency Perform decimation and interpolation
	SPCP 02	Digital Image Video Processing Lab	2018	Perform image and video enhancement Perform image and video segmentation Detect an object in an image/video
	PGMC 01	Research Methodology and IPR	2018	1. understand research problem formulation. 2. analyze research related information 3. follow research ethics 4. understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 5. understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. 6. understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
	PGPA11	English and Research Paper Writing	2018	1. Understand that how to improve your writing skills and level of readability 2. Learn about what to write in each section 3. Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission
	PGPA12	Disaster Management	2018	1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian

				<p>response.</p> <ol style="list-style-type: none"> 2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. 3. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in
	PGPA13	Sanskrit for Technical Knowledge	2018	<ol style="list-style-type: none"> 1. Understanding basic Sanskrit language 2. Ancient Sanskrit literature about science & technology can be understood 3. Being a logical language will help to develop logic in students
	PGPA14	Value Education	2018	<ol style="list-style-type: none"> 1. Knowledge of self-development 2. Learn the importance of Human values 3. Developing the overall personality
	SPPC 03	Pattern Recognition and Machine Learning	2018	<p>Study the parametric and linear models for classification Design neural network and SVM for classification Develop machine independent and unsupervised learning techniques.</p>
	SPPC 04	Detection and Estimation Theory	2018	<ul style="list-style-type: none"> • Understand the mathematical background of signal detection and estimation • Use classical and Bayesian approaches to formulate and solve problems for signal detection and parameter estimation from noisy signals. • Derive and apply filtering methods for parameter estimation.
	SPPE 31	Advanced Computer Architecture	2018	<ul style="list-style-type: none"> • Understand parallelism and pipelining concepts, the design aspects and challenges. • Evaluate the issues in vector and array processors.

				<ul style="list-style-type: none"> Study and analyze the high performance scalable multithreaded and multiprocessor systems.
	SPPE 32	IOT and Applications	2018	<p>Understand the concept of IOT and M2M</p> <p>Study IOT architecture and applications in various fields</p> <p>Study the security and privacy issues in IOT.</p>
	SPPE 33	Digital Design and Verification	2018	<ul style="list-style-type: none"> Familiarity of Front end design and verification techniques and create reusable test environments. Verify increasingly complex designs more efficiently and effectively. Use EDA tools like Cadence, Mentor Graphics.
	SPPE 41	Multispectral Signal Analysis	2018	<ul style="list-style-type: none"> Select appropriate hyperspectral data for a particular application. Understand basic concepts of data acquisition and image processing tasks required for multi and hyperspectral data analysis Learn techniques for classification and analysis of multi and hyperspectral data.
	SPPE 42	Audio Processing	2018	<ul style="list-style-type: none"> Understand different characteristics of Speech. Identify and analyze different speech analysis system. Write algorithms for Recognition of speech.
	SPPE 43	Biomedical Signal Processing	2018	<ul style="list-style-type: none"> Understand different types of biomedical signal. Identify and analyze different biomedical signals Find applications related to biomedical signal processing
	SPCP 03	Pattern Recognition and Machine Learning Lab	2018	<ul style="list-style-type: none"> Perform image and video enhancement Perform image and video segmentation Detect an object in an image/video
	SPCP 04	Detection and Estimation Theory Lab	2018	<ul style="list-style-type: none"> Simulate signals and noise Detect signals in the presence of noise Compare various estimation techniques
	PGPA21	Constitution of India	2018	1. the growth of the demand for civil rights in India for

				<p>the bulk of Indians before the arrival of Gandhi in Indian politics.</p> <p>2. the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</p> <p>3. the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</p> <p>4. the passage of the Hindu Code Bill of 1956.</p>
	PGPA22	Pedagogy Studies	2018	<p>1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</p> <p>2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</p> <p>3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</p>
	PGPA23	Stress Management by Yoga	2018	<p>1. Develop healthy mind in a healthy body thus improving social health also</p> <p>2. Improve efficiency</p>
	PGPA24	Personality Development through Life Enlightenment Skills	2018	<p>1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life</p> <p>2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity</p> <p>3. Study of Neetishatakam will help in developing versatile personality of students</p>
	SPMP 01	Mini Project with seminar	2018	<ul style="list-style-type: none"> • Understand of contemporary / emerging technology for various processes and systems. • Share knowledge effectively in oral and written form

				and formulate documents.
	SPPE 51	Remote Sensing	2018	Understand basic concepts, principles and applications of remote sensing, particularly the geometric and radiometric principles Provide examples of applications of principles to a variety of topics in remote sensing, particularly related to data collection, radiation, resolution, and sampling.
	SPPE 52	Optimization Techniques	2018	<ul style="list-style-type: none"> • Understand importance of optimization • Apply basic concepts of mathematics to formulate an optimization problem • Analyze and appreciate variety of performance measures for various optimization problems
	SPPE 53	Modelling and Simulation Techniques	2018	<ul style="list-style-type: none"> • Identify and model discrete systems (deterministic and random) • Identify and model discrete signals (deterministic and random) • Understand modelling and simulation techniques to characterize systems/processes.
	PGOE 11	Business Analytics	2018	<ol style="list-style-type: none"> 1. knowledge of data analytics. 2. the ability of think critically in making decisions based on data and deep analytics. 3. the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. the ability to translate data into clear, actionable insights.
	PGOE 13	Operation Research	2018	<ol style="list-style-type: none"> 1. apply the dynamic programming to solve problems of discreet and continuous variables. 2. apply the concept of non-linear programming 3. carry out sensitivity analysis 4. model the real world problem and simulate it.

	SPPD 01	Dissertation Phase-I	2018	<ul style="list-style-type: none"> • Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem. • Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design. • Ability to present the findings of their technical solution in a written report. • Presenting the work in International/ National conference or reputed journals.
	SPPD 02	Dissertation Phase- II	2018	<ul style="list-style-type: none"> • Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem. • Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design. • Ability to present the findings of their technical solution in a written report. • Presenting the work in International/ National conference or reputed journals.

Electrical & Electronics Engineering B.Tech

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	EMABS T301	Mathematics –III	2018	<ol style="list-style-type: none"> 1. Solve field problems in engineering involving PDEs. 2. They can also formulate and solve problems

				involving random variables and apply statistical methods for analysing experimental data.
	EEPCT 302	Electro Magnetic Fields	2018	<ol style="list-style-type: none"> 1. To understand the basic laws of electromagnetism. 2. To obtain the electric and magnetic fields for simple configurations under static conditions. 3. To analyse time varying electric and magnetic fields. 4. To understand Maxwell's equation in different forms and different media. 5. To understand the propagation of EM waves.
	EEPCT 303	Electrical Circuit Analysis	2018	<ol style="list-style-type: none"> 1. Apply network theorems for the analysis of electrical circuits. 2. Obtain the transient and steady-state response of electrical circuits. 3. Analyse circuits in the sinusoidal steady-state domain (single-phase and three phase). 4. Analyse two port circuit behaviour
	EEPCT 304	Electrical Machines-I	2018	<ol style="list-style-type: none"> 1. Understand the concepts of magnetic circuits. 2. Understand the operation of dc machines. 3. Analyse the differences in operation of different dc machine configurations. 4. Analyse single phase and three phase transformers circuits.
	ECPCT 305	Analog Electronics	2018	<ol style="list-style-type: none"> 1. Understand the characteristics of transistors. 2. Design and analyse various rectifier and amplifier circuits. Design sinusoidal and non-sinusoidal oscillators. 3. Understand the functioning of OP-AMP and design OP-AMP based circuits.

	EOHST 306	Economics	2018	<ol style="list-style-type: none"> 1. At the end of this course, students will demonstrate the ability to 2. Analyse the demand Analysis and Demand forecasting 3. Understand the cost and supply analysis of the products 4. Understand the different market structures and their profit analysis
	PAMCT 310	INDIAN CONSTITUTIONAL RIGHTS	2018	<ol style="list-style-type: none"> 1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. 4. Discuss the passage of the Hindu Code Bill of 1956.
	EEPCT401	Power Systems-I	2018	<ol style="list-style-type: none"> 1. Understand the basic concepts of power systems. 2. Understand the various power system components. 3. Acquire knowledge on different types of generation stations. 4. Acquire knowledge on design of transmission lines 5. Acquire knowledge on transformers and steady state response of synchronous machines
			2018	<ol style="list-style-type: none"> 1. Understand working of logic families and logic

ECPCT 402	Digital Electronics		<ul style="list-style-type: none"> gates. 2. Design and implement Combinational and Sequential logic circuits. 3. Understand the process of Analog to Digital conversion and Digital to Analog conversion. 4. Be able to use PLDs to implement the given logical problem.
ECPCT 403	Signals and Systems	2018	<ul style="list-style-type: none"> 1. Understand the concepts of continuous time and discrete time systems. 2. Analyse systems in complex frequency domain. 3. Understand sampling theorem and its implications.
EEPCT 404	Electrical Machines – II	2018	<ul style="list-style-type: none"> 1. Understand the concepts of rotating magnetic fields. 2. Understand the operation of ac machines. 3. Analyse performance characteristics of ac machines. 4. Determine performance of ac machines
EOHS T405	Accountancy	2018	<ul style="list-style-type: none"> 1. Know the functions of Accounting 2. Understand the financial Analysis 3. Understand the concepts of Depreciation 4. Learn the payback period of capital Budget
EEPC P406	Measurements and Instrumentation Laboratory	2018	<ul style="list-style-type: none"> 1. Design and validate DC and AC bridges. 2. Analyze the dynamic response and the calibration of few instruments. 3. Learn about various measurement devices, their characteristics, their operation and their limitations. 4. Understand statistical data analysis. 5. Understand computerized data acquisition.
EEPCT50 1	Control Systems	2018	<ul style="list-style-type: none"> 1. Understand the modelling of linear-time-invariant systems using transfer function and state-space representations. 2. Understand the concept of stability and its assessment for linear-time invariant systems. 3. Design simple feedback controllers.

	EEPCT 502	Power Systems – II	2018	<ol style="list-style-type: none"> 1. Understand the concepts of Compensation in transmission lines. 2. Understand the generation of over-voltages and insulation coordination 3. Understand the various power system components. 4. Evaluate fault currents for different types of faults.
	ECPCT50 3	Microprocessors	2018	<ol style="list-style-type: none"> 1. Do assembly language programming. 2. Do interfacing design of peripherals like I/O, A/D, D/A, timer etc. 3. Develop systems using different microcontrollers.
	CSPET50 4.1	Computer Organisation and Architecture	2018	<ol style="list-style-type: none"> 1. Understand the concepts of microprocessors, their principles and practices. 2. Write efficient programs in assembly language of the 8086 family of microprocessors. Organize a modern computer system and be able to relate it to real examples. 3. Develop the programs in assembly language for 80286, 80386 and MIPS processors in real and protected modes. 4. Implement embedded applications using ATOM processor.
	EEPET 504.2	Digital Signal Processing	2018	<ol style="list-style-type: none"> 1. Represent signals mathematically in continuous and discrete-time, and in the frequency domain. 2. Analyse discrete-time systems using z-transform. 3. Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms. <p>Design digital filters for various applications.</p>
	EEPET 504.3	MATLAB And SIMULINK	2018	<ol style="list-style-type: none"> 1. To learn the MATLAB environment and its programming fundamentals 2. Ability to write Programs using commands and functions 3. Able to handle and solve the problems using matlab and Able to draw the plots

				4. Able to create Simulink model
	EEPCT6 01	Power Systems -III	2018	<ol style="list-style-type: none"> 1. Use numerical methods to analyse a power system in steady state. 2. Understand stability constraints in a synchronous grid. 3. Understand methods to control the voltage, frequency and power flow. 4. Understand the monitoring and control of a power system. 5. Understand the basics of power system economics.
	EEPCT- 602	Power Electronics	2018	<ol style="list-style-type: none"> 1. Understand the differences between signal level and power level devices. 2. Analyse controlled rectifier circuits. 3. Analyse the operation of DC-DC choppers. 4. Analyse the operation of voltage source inverters.
	EEPET 603.2	Electrical Machine Design	2018	<ol style="list-style-type: none"> 1. Understand the construction and performance characteristics of electrical machines. 2. Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machines 3. Understand the principles of electrical machine design and carry out a basic design of an ac machine. 4. Use software tools to do design calculations.
	EEPET 603.3	Special Machines	2018	<ol style="list-style-type: none"> 1. understand field aspects of electrical machines 2. understand the operation and control of <ol style="list-style-type: none"> (i) stepper motors (ii) BLDC motors (iii) SR motors
	EEPET 604.1	Control Systems Design	2018	<ol style="list-style-type: none"> 1. Design controllers to satisfy the desired design specifications using simple controller structures (P, PI, PID, compensators). 2. Controller design with time domain and frequency domain approach. 3. Design controllers using the state-space approach.
	EEPET	Digital Control Systems	2018	<ol style="list-style-type: none"> 1. Obtain discrete representation of LTI systems.

	604.2			<ol style="list-style-type: none"> 2. Analyse stability of open loop and closed loop discrete-time systems. 3. Design and analyse digital controllers. 4. Design state feedback and output feedback controllers.
	EEPET 604.3	PLC's and Applications	2018	<ol style="list-style-type: none"> 1. understand applications of PLCs and different types of PLCs 2. use Easy Veep software 3. learn hardware details of Allen bradely PLC 4. programming of PLCs
	MGHST6 06	Management Science	2018	<ol style="list-style-type: none"> 1. Work more creatively, work in groups 2. Presenting ideas more effectively and efficiently in formal and informal ways 3. Development of fundamental rethinking and radical redesign in the organizations. 4. Applying the ideas of the course to identifying and solving real world problems. 5. Development of Group Dynamic Skills.
	ECPCP60 8	Electronics Design Laboratory	2018	<ol style="list-style-type: none"> 1. Understand the practical issues related to practical implementation of applications using electronic circuits. 2. Choose appropriate components, software and hardware platforms. 3. Design a Printed Circuit Board, get it made and populate/solder it with components. Work as a team with other students to implement an application.
	EEPET 701.1	Power System Protection	2018	<ol style="list-style-type: none"> 1. Understand the different components of a protection system. 2. Evaluate fault current due to different types of fault in a network. 3. Understand the protection schemes for different power system components. 4. Understand the basic principles of digital protection.

				5. Understand system protection schemes, and the use of wide-area measurements.
	EEPET 701.2	Advanced Microprocessors	2018	<ol style="list-style-type: none"> 1. learn architectural differences between different Intel processors 2. learn different types of RISC processors 3. know PC hardware and its overview
	EEPET 701.3	Line-Commutated and Active Rectifiers	2018	<ol style="list-style-type: none"> 1. Understand the operation of line commutated rectifiers– 6 pulse and multipulse configurations. 2. Understand the operation of PWM rectifiers – operation in rectification and regeneration modes and lagging, leading and unity power factor mode.
	EEPET 702.1	Electrical Drives	2018	<ol style="list-style-type: none"> 1. Understand the characteristics of dc motors and induction motors. 2. Understand the principles of speed-control of dc motors and induction motors. 3. Understand the power electronic converters used for dc motor and induction motor speed control
	EEPET 702.2	Power System Dynamics and Control	2018	<ol style="list-style-type: none"> 1. Understand the problem of power system stability and its impact on the system. 2. Analyze linear dynamical systems and use of numerical integration methods. 3. Model different power system components for the study of stability. 4. Understand the methods to improve stability.
	EEPET 702.3	High Voltage Engineering	2018	<ol style="list-style-type: none"> 1. Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials. 2. Knowledge of generation and measurement of D. C., A.C., & Impulse voltages. Knowledge of tests on H. V. equipment and on insulating materials, as per the standards.

				3. Knowledge of how over-voltages arise in a power system, and protection against these over-voltages.
	EEPET 801.1	HVDC Transmission Systems	2018	<ol style="list-style-type: none"> 1. Understand the advantages of dc transmission over ac transmission. 2. Understand the operation of Line Commutated Converters and Voltage Source Converters. 3. Understand the control strategies used in HVDC transmission system. 4. Understand the improvement of power system stability using an HVDC System.
	EEPET 801.2	Power Quality and FACTS	2018	<ol style="list-style-type: none"> 1. Understand the characteristics of ac transmission and the effect of shunt and series reactive compensation. 2. Understand the working principles of FACTS devices and their operating characteristics. 3. Understand the basic concepts of power quality. 4. Understand the working principles of devices to improve power quality.
	EEPECT 801.3	Advanced Electrical Drives	2018	<ol style="list-style-type: none"> 1. To understand the operation of power electronic converters and their control Strategies. 2. To understand the vector control strategies for ac motor drives 3. To understand the implementation of the control strategies using digital Signal processors.
	EEOET- 802.1	Electrical Energy Conservation and Auditing	2018	<ol style="list-style-type: none"> 1. Understand the current energy scenario and importance of energy conservation. 2. Understand the concepts of energy management. 3. Understand the methods of improving energy efficiency in different electrical systems. 4. Understand the concepts of different energy efficient devices.
	EEPET	ARM Architecture and	2018	<ol style="list-style-type: none"> 1. Understand architecture and addressing modes of

	802.2	Programming		<p>ARM processor</p> <ol style="list-style-type: none"> 2. Write assembly programs for ARM processor 3. Learn coprocessor instructions and memory management 4. Use different tools for programming ARM processor with its peripherals
	EEPET 802.3	Principles of Communication Systems	2018	<ol style="list-style-type: none"> 1. Work on various types of modulations. Should be able to use these communication modules in implementation. 2. Will have a basic understanding of various wireless and cellular, mobile and telephone communication systems
	EEOET01	Power Plant Engineering	2018	<ol style="list-style-type: none"> 1. To provide an overview of coal based thermal power plants and gas turbine and combined cycle power plants. 2. To provide an overview of nuclear power plants and hydro electric power plants and the associated energy conversion issues.
	EEOET 03	Neural Network And Fuzzy Logic	2018	<ol style="list-style-type: none"> 1. To provide students basic knowledge on Artificial Neural Networks and learning rules. 2. To provide students basic knowledge on supervised learning. 3. To make students understand fundamentals of fuzzy logic and fuzzy sets. 4. To provide students basic knowledge on design of fuzzy systems. 5. To provide students good knowledge on Neuro-fuzzy modelling.
	EEOET04	Renewable Energy Systems	2018	<ol style="list-style-type: none"> 1. Introduce aspects of different Energy Sources and Energy scenario in India. 2. Understand the Particulars of solar energy and collectors. 3. Understand the Essentials of the solar energy storage

				and application of solar energy. 4. Understand the Fundamentals of Biomass energy systems, analysis and testing. 5. Know the Details of wind energy, wind turbines and their controls.
	EEOET 05	Industrial Electrical Systems	2018	1. Understand the electrical wiring systems for residential, commercial and industrial consumers, representing the systems with standard symbols and drawings, SLD. 2. Understand various components of industrial electrical systems. 3. Analyze and select the proper size of various electrical system components.

Mechanical Engineering:

B.Tech:

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	MABST101	Mathematics–I	2018	Applying various statistical models and methods for drawing conclusions and making decisions under uncertainty in engineering contexts Apply statistical and numerical methods in various computer science related projects, seminars and research Apply the knowledge of iterative methods to solve algebraic and transcendental equations, simultaneous linear equations, ODE

				<p>(ordinary differential equations)</p> <p>Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration</p> <p>Demonstrate a basic knowledge of the techniques for accurate and efficient solution of models based on linear and nonlinear systems of equations, ordinary differential equations and partial differential equations.</p>
	CYBST102	Engineering Chemistry	2018	<p>To predict the atomic structure, chemical bonding, and molecular geometry based on accepted models and characterize the bonding between atoms, molecules, interaction, energetics, hybridization, molecular orbitals and bond parameters.</p> <p>Exposure of light on different chemicals produce color of chemicals and also able to carry out chemical conversion based on theoretical basis of photochemistry as well as different types of spectroscopy.</p> <p>Understand the chemical equilibrium, Intermolecular forces and potential energy surfaces and able to apply them on thermodynamic functions.</p> <p>Able to understand the physical and chemical characteristics of elements in various groups and periods according to ionic size, charge, etc.</p>

				<p>and position in periodic table.</p> <p>Able to understand the stereochemistry of organic molecules – conformation and configuration, asymmetric molecules and nomenclature.</p>
	ENHST103	English	2018	<p>Participate in discussions with emphasis on narrating and describing situations to develop oral communication skills including fluency, idea sequencing, accuracy, vocabulary and pronunciation</p> <p>Able to use prewriting techniques to develop ideas and produce multiple drafts of different types of paragraphs</p> <p>Able to organize and write coherent sentences, paragraphs, and essays free of grammatical errors that impede comprehension</p> <p>Able to create written texts in a variety of literary genres that demonstrate an ability to apply literary techniques and discriminate among aesthetic values</p> <p>Strengthen their ability to write academic papers, essays and summaries using the process approach.</p>
	EEEST104	Basic Electrical & Electronics Engineering	2018	<p>Familiarity with basic electronic components and use them to design simple electronic circuits</p> <p>Able to derive expression for impedance, current, power in series and parallel RLC circuit with</p>

				<p>AC supply along with phasor diagram. Relate phase and line electrical quantities in polyphase networks, demonstrate the operation of single phase transformer and calculate efficiency and regulation at different loading conditions Gain knowledge regarding electrical machines and apply them for solving practical problems Evaluate work, power, energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge</p>
	MEEST105	EngineeringGraphics	2018	<p>Able to Select, Construct and Interpret appropriate drawing scales, simple curves like ellipse, cycloid and spiral as per the situation. Able to draw projections of points and lines in any direction of plane. Able to draw projections of planes and solids in any direction of a plane. Draw orthographic projection of solids like cylinders, cones, prisms and pyramids including sections. Able to create basic drawings with drawing commands in Autocad.</p>
	ENHSP106	English Communications Lab	2018	<p>Better pronunciation and accent Ability to use functional English Competency in analytical skills and problem solving skills Increase possibilities of job prospects</p>

				Communicate confidently in formal and informal contexts
	MABST201	Mathematics–II	2018	<p>Use ranks of matrices to decide whether the system of linear equations is consistent or not and hence solve.</p> <p>Acquire knowledge about the physical interpretation of the gradient, divergence and curl.</p> <p>Able to know the basic results about the properties of Fourier transform and Fourier series and its convergence.</p> <p>Acquire the knowledge of properties of special functions and to use this to solve differential equations.</p> <p>Able to generate the functions of Legendre polynomials.</p>
	PYBST202	Engineering Physics	2018	<p>Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.</p> <p>Able to demonstrate competency and understanding of the concepts found in Mechanics, Harmonic Oscillations, Waves in one dimension, wave Optics, Lasers, and a broad base of knowledge in physics</p> <p>Able to know the significance of Maxwell's equations in the Engineering applications of electromagnetic and ferromagnetic materials.</p>

				<p>Be able to understand the basic principles of Quantum mechanics and to apply these to the complex phenomenon of matter radiation interaction.</p> <p>Be able to understand the basic principles of Quantum mechanics and to apply these to the complex phenomenon of matter radiation interaction.</p>
	CSEST203	Programs for problem solving	2018	<p>Learn about fundamentals of computer and programming language, draw flow chart to solve given problem logically and develop algorithm to solve given program</p> <p>Able to use the concept of branching and looping to design efficient C program and be able to</p> <p>apply the concepts of user defined function and recursion to support reusability</p> <p>Able to discuss basic algorithmic analysis for simple algorithms; determine appropriate algorithmic approaches to a real world problems.</p> <p>Apply fundamental programming concepts, using a functional programming language, to solve problems.</p> <p>Design and develop a modular program in C for commercial billing activities using an array of structures and pointers.</p>
	MEEST204	Manufacturing Processes	2018	<p>Able to select materials, types and allowances of patterns and analyze the components of</p>

				<p>moulds, gating system in metal casting processes.</p> <p>Develop process-maps for metal working processes using plasticity principles</p> <p>Able to analyze Hot and Cold Working, Forging, Extrusion and Drawing Processes</p> <p>Design and Analyze different sheet metal working processes</p> <p>Understand different Welding and joining processes and its defects</p>
	MEESP205	Workshop/ Manufacturing Practice	2018	<p>Design and develop different types of wood joints based on the requirement</p> <p>Design and develop different types of fittings as per requirement</p> <p>Able to develop prototype models by using tin smithy tools.</p> <p>Design and develop different moulds as per practical requirements.</p> <p>Able to connect bulbs either series or parallel</p>
	CSESP206	Programs for problem solving Lab	2018	<p>Able to know concepts in problem solving</p> <p>To do programming in C language</p> <p>To write diversified solutions using C language</p> <p>Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.</p> <p>Able to develop programs for real world applications using Java</p>
	CEMCT207	Environmental Science	2018	<p>Able to understand the importance of the environment</p> <p>Able to identify conservation concepts of natural resources</p> <p>Able to identify problems due to human</p>

				<p>interactions in the environment</p> <p>Able to understand the enforcement of environment acts in our constitution</p> <p>Capable of managing social issues related to environment</p>
	MEPCT301	Thermodynamics	2018	<p>Understanding the concepts such as conservation of mass, conservation of energy, work interaction, heat transfer and first law of thermodynamics</p> <p>Recognize and understand the different forms of energy and restrictions imposed by the first law of thermodynamics on conversion from one form to another.</p> <p>Solve the practical thermodynamic problems by applying first law and steady flow energy equation</p> <p>Able to explain the concept of entropy, including the Clausius Inequality, using thermodynamic tables, setting up entropy balances, and calculating isentropic efficiency of pumps, compressors, turbines, and heat exchangers.</p> <p>Able to estimate performance of various Thermodynamic and air standard cycles.</p>
	MABST302	Numerical Methods	2018	<p>Applying various statistical models and methods for drawing conclusions and making decisions under uncertainty in engineering contexts</p> <p>Apply statistical and numerical methods in various computer science related projects,</p>

				<p>seminars and research</p> <p>Apply the knowledge of iterative methods to solve algebraic and transcendental equations, simultaneous linear equations, ODE (ordinary differential equations)</p> <p>Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration</p> <p>Demonstrate a basic knowledge of the techniques for accurate and efficient solution of models based on linear and nonlinear systems of equations, ordinary differential equations and partial differential equations</p>
	MEPCT303	Industrial safety and measures	2018	<p>Understand the functions and activities of safety engineering and carry out a safety audit and able to submit a report for the audit.</p> <p>To evaluate the safety performance of an organization from accident records</p> <p>Able to understand the operation of various protection systems from electrical hazards and recognize different hazardous zones in Industries</p> <p>Understand the methods of hazard identification and preventive measures.</p> <p>Identify equipment requirements for a specific process and for various locations, working conditions and difficulties during the design and implementation of the plant layout.</p>
	CEEST304	Engineering Mechanics	2018	<p>Able to determine the resultant force and moment for a given force system</p>

				<p>Able to determine the centroid and moment of inertia of composite sections</p> <p>Able to understand the operation of various protection systems from electrical hazards and recognize different hazardous zones in Industries</p> <p>Understand the methods of hazard identification and preventive measures.</p> <p>Identify equipment requirements for a specific process and for various locations, working conditions and difficulties during the design and implementation of the plant layout.</p>
	MEPCT305	Manufacturing Technology	2018	<p>Having knowledge on machines and related tools for manufacturing various components. Able to understand the tooling needed for manufacturing, dimensional accuracy and tolerances of products, assembly of different Components in various manufacturing applications.</p> <p>Able to identify the techniques for the quality assurance of the products and the optimality of the process in terms of resources and time management.</p> <p>Have knowledge about different measurement methods and instruments, both traditional and modern that is used in the industry to measure product dimensions, shape and surface structure.</p> <p>Able to select materials and manufacturing processes for producing low cost high quality products in the market.</p>

	COHST306	Finance and Accounting	2018	
	MEPCT308	Advanced Engineering Graphics	2018	<p>Able to draw Projections of solids and Auxiliary projections of solids parallel to one plane perpendicular to both the planes Able to analyze and draw section of solids inclined to both the planes Able to develop surfaces of solids which are perpendicular to both the planes Able to draw interpretation of solids in any angle Able to draw isometric projections of simple objects</p>
	MEPCP309	Manufacturing Process Lab	2018	<p>To impart knowledge of different types of machine tools and their constructional details like lathe, milling and shaping machines. Able to develop knowledge about types of cutting tools, single point and multi point cutting tool and the manufacture of these tools, the speeds at which a specific type of tool will machine a particular type of material. Acquire knowledge about coolants and lubrication, their use and purpose while machining. Able to analyze different types of cutting tools, single point and multi point cutting tool and the manufacture of these tools, the speeds at which a specific type of tool will machine a particular type of material. Able to perform different operations on lathe, milling and shaping by conducting</p>

				experiments on these machine tools.
	PAMCT401	ConstitutionofIndia	2018	
	MEPCT402	Applied Thermodynamics	2018	<p>Able to analyze energy conversion in various thermal devices such as combustors, aircoolers, nozzles, diffusers, steam turbines and reciprocating compressors</p> <p>Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart</p> <p>Able to analyze, evaluate and draw conclusions regarding the performance of Rankine cycles, geothermal power cycles, and combined cycles.</p> <p>Able to apply the fundamentals of compressible flow concepts and the use of gas tables for design of nozzles.</p> <p>Evaluate the performance of steam turbines through velocity triangles, understand the need for governing and compounding of turbines.</p>
	CEPCT403	FluidMechanics &FluidMachines	2018	<p>Identify and obtain the values of fluid properties and relationship between them and understand the principles of continuity, momentum, and energy as applied to fluid motions.</p> <p>Identify conditions under which flows are</p>

				<p>turbulent and derive equations that approximate its properties (time averages and fluctuations). Compare turbulent flow with those of laminar flow.</p> <p>Identify the relevant parameters that govern a fluid system and use dimensional analysis to identify the fundamental variables that define flow</p> <p>Apply Euler's Equation of motion and Bernoulli's equation for flow measuring devices and hydraulic machines.</p> <p>Able to design and evaluate the performance of pumps and turbines.</p>
	CEPCT404	Solid Mechanics	2018	<p>Learn about the elastic and plastic behavior of material and evaluate stress invariants, principal stresses and their directions.</p> <p>Determine strain invariants, principal strains and their directions.</p> <p>Develop constitutive relationships between stress and strain for linearly elastic solid.</p> <p>Analyze theories of failure and design components for safe operation.</p> <p>Examine the properties of ideally plastic solid and apply the concepts of energy methods in solving structural problems.</p>

	MEPCT405	MaterialsEngineering	2018	<p>Analyze the Structure of materials at different levels, basic concepts of crystalline materials like unit cell, FCC, BCC, HCP, APF (Atomic Packing Factor), Co-ordination Number etc.</p> <p>Understand concept of mechanical behavior of materials and calculations of same using appropriate equations</p> <p>Able to explain the concept of phase & phase diagram & understand the basic terminologies associated with metallurgy. Construction and identification of phase diagrams and reactions</p> <p>Able to produce materials by using different types of production processes and know the real life applications in practical cases.</p> <p>Able to construct TTT diagrams and cooling curves and understand and suggest the heat treatment process & types. Significance of properties Vs microstructure. Surface hardening & its types.</p>
	MEPCT406	Instrumentation and Control	2018	<p>Able to know the terms of the measurements, and understand the principle of operation of an instrument, Choose Suitable measuring instruments for a particular application and Apply ethical principles while measuring dimensions.</p> <p>Apply the principles of instrumentation for transducers & measurement of non-electrical parameters like temperature, pressure, flow, speed, force and stress in mechanical</p>

				<p>engineering applications for sustainable development.</p> <p>Selection and describe the functioning of force, torque, pressure, strain and temperature measuring devices.</p> <p>Select appropriate device for the measurement of parameters like temperature, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.</p> <p>Select and install the various measuring instruments in flow lines used for industrial purposes.</p>
	MEPCT407	Machine Drawing	2018	<p>Draw orthographic projections of lines, planes and solids</p> <p>Identify and design different machine elements for joining purposes</p> <p>Identify and draw the couplings and riveted joints</p> <p>able to construct an assembly drawing using part drawings of machine components</p> <p>Able to construct an part drawings using assembly drawing of machine components</p>
	MEHST 408	Operations Research	2018	<p>Understand the concepts of operations research modelling approaches and solve</p>

				<p>LP engineering problems.</p> <p>Formulate and solve engineering and managerial situations as Transportation and Assignment problems.</p> <p>Able to solve replacement and game theory model problems.</p> <p>Able to Solve inventory problems.</p> <p>Able to simulate simple inventory and queuing models.</p>
	MEPCP409	Fuels and IC Engines Laboratory	2018	<p>Analyze important fuel and lubricant properties for the application in specific exploitation conditions</p> <p>Measure flash & fire point of different fuels and measure performance of a centrifugal blower.</p> <p>Conduct constant speed and variable speed tests on IC engines and interpret their performance.</p> <p>Estimate energy distribution by conducting heat balance test on IC engines</p> <p>Able to draw valve timing and port timing diagrams of Petrol & Diesel engines.</p>
	MEPCT501	HeatTransfer	2018	<p>Understand principles of different modes of heat transfer processes.</p>

				<p>Formulate and solve conduction and convective heat transfer problems.</p> <p>Estimate and solve radiation problems of black, gray and opaque bodies.</p> <p>Understand current challenges in the field of convective heat transfer.</p> <p>Evaluate energy requirements for operating a flow system with heat exchanger.</p>
	MEPCT502	DesignofMachine Elements	2018	<p>Understand the customers' need, formulate the problem and draw the design specifications</p> <p>Able to select components as per standards and Understand component behavior subjected to loads and identify the failure criteria</p> <p>able to design a machine component in fluctuating loads</p> <p>able to design fasters for different mechanical purposes and identify welded joints and their failure</p> <p>Able to design and analyze springs</p>
	MEPCT504	KinematicsofMachinery	2018	<p>Understand the principles of kinematic pairs, chains and their classification, DOF, inversions, equivalent chains and planar mechanisms.</p> <p>Acquire knowledge and develop straight line motion mechanisms and steering</p>

				<p>mechanisms.</p> <p>Able to draw velocity and acceleration diagrams for different mechanisms</p> <p>Able to design and develop gear and gear train depending on application.</p> <p>Design cams and followers for specified motion profiles.</p>
	MEPET505	Elective-I	2018	
	MEPCP507	Machine Tools and Automation Lab	2018	<p>Analyze forces, can control appropriateness for machine power according to working standards</p> <p>Able to produce single point cutting tools as per standards</p> <p>Able to conduct different machine alignment tests on lathe and drilling machines</p> <p>Study and analyze the tool wear and indexing</p> <p>Develop Programming skills and crate a component for required drawing, Simulate the prepared part programme using available simulation software's. And Prepare the parts on CNC</p>
	MEPCP508	Metrology Lab	2018	<p>Prepare setups and measure dimensional and geometrical features of components.</p> <p>Measure surface roughness of components.</p> <p>Able to do alignment tests</p>

				<p>Able to calibrate different mechanical instruments for general purposes</p> <p>Gain knowledge on different setups for measuring thread profile</p>
	EOHST601	Economics	2018	<p>Analyze the demand and supply conditions and assess the position of a company</p> <p>Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.</p> <p>Assess the relationships between short-run and long-run costs.</p> <p>Appraise some of the current and emerging issues in managerial economics at the national and international levels.</p> <p>Explain four different pricing practices such as discrimination, two part pricing, block pricing, commodity bundling, transfer pricing, and peak load pricing</p>
	MEPCT602	Machine Design	2018	<p>Apply the design and development procedure for different types of springs by using Design Data Hand book.</p> <p>To achieve an expertise in design of Sliding contact bearing in industrial applications.</p>

				<p>Capability to analyze Rolling contact bearing and its selection from manufacturer's Catalogue.</p> <p>To understand and apply principles of gear design to spur gears and also become proficient in design of Helical and Bevel Gear.</p> <p>Able to design and construct engine parts as per the automotive and industrial requirements.</p>
	MEPCT603	Dynamics of Machinery	2018	<p>Able to analyze and design clutches, brakes and dynamometers.</p> <p>Understand the gyroscopic effects in ships, aero planes, road vehicles and Characterize & design flywheels of an IC Engine.</p> <p>Able to analyze and design centrifugal governors.</p> <p>Analyze balancing problems in rotating and reciprocating machinery</p> <p>Understand free and forced vibrations of single degree freedom systems.</p>
	MEPET604	Elective-II	2018	<p>Interpret different heating sources of building and its calculations</p> <p>Design and recommend low cost and high-</p>

				<p>performance air conditioning duct which find applications in modern industries, homes and offices</p> <p>Determine the performance of refrigeration and air conditioning systems by conducting experiments.</p> <p>Carry out psychometric calculations and air conditioning cooling load estimation.</p> <p>Ability to estimate the energy requirements of cooling and heat equipment for simple air conditioning applications</p>
	MEPCP605	Strength of Materials & Fluid Mechanics Laboratory	2018	<p>Ability to perform a thermodynamic analysis of ideal cycles and fuel-air cycles.</p> <p>Ability to perform a combustion analysis of fuels in the basic cycles.</p> <p>Analyze different electronic fuel injection system, supercharging and its effect on performance of SI and CI engine.</p> <p>Able to understanding the role of lubrication and cooling systems in reducing friction and wear.</p> <p>Able to specify and interpret data of alternative fuels and its emission which effect the environment.</p>
	MEPCP606	Heat Transfer Laboratory	2018	<p>Describe the power generation scenario, the layout components of thermal power plant and analyze the improved Rankin cycle,</p>

				<p>Cogeneration cycle</p> <p>Realize the details of gas power plant and analyze gas turbine power cycles. Able to identify elements and their functions and operations of nuclear and gas turbine power plants Able to recognize the layout, component details of hydroelectric power plant and nuclear power plant</p> <p>Know the Social and Economic issues of power plants and describe the different power plant electrical instruments and basic principles of economics of power generation.</p>
	MEOET607	Open Elective-I (MOOCS)	2018	<p>Able to study various non-conventional sources of energy like wind, biomass etc and its applications in remote areas of the country. Able to understand the instruments for measuring solar radiation and analyze the solar radiation data. Able to understand the principles and applications of solar energy, solar energy collection, solar heating, solar distillation and photo voltaic energy. Understand the Geothermal, Wind & Tidal energy, its mechanism of production and its applications</p> <p>Understand the concept of Biomass energy resources and their classification, types of</p>

				biogas Plants- applications
	MEPET701	Automobile Engineering	2018	<p>Able to know the concepts of different types of engines and their parts Able to select air cleaners and carburetors for petrol and diesel engines</p> <p>Acquire knowledge on cooling systems, lubrication systems and ignition systems of SI and CI engines Design clutches and gear boxes for small vehicles</p> <p>Able to select different steering mechanisms and brakes for smooth moving of vehicle</p>
	MEPEP703	CAD / CAM Laboratory	2018	<p>Able to understand the role of CAD in mechanical component and system design by creating geometric models and engineering drawings. To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.</p> <p>Acquire knowledge and understanding of modeling concepts and computer implementation of lines, curves, surfaces and transformations.</p> <p>Able to know the usage of numerical control machines and its codes and also know how computer is useful in making the process planning.</p>

				Able to apply the concepts of production planning & control and group technology to the development of FMS.
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M.Tech- (Industrial Engineering):

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	IEPC 01	Operations Planning and Control	2018	<ol style="list-style-type: none"> 1. Forecasting principles and techniques for short range and long range planning 2. Production requirements for each product and plan the shop floor activities 3. Work station loading and scheduling of paths to avoid bottle necks for smooth production 4. Solution for product mix decision using OR techniques. 5. Optimal job sequences to achieve the minimum make span with maximum production output
	IEPC 02	Work System Design	2018	<ol style="list-style-type: none"> 1. Work study principle and design effective work layout for minimal hand and body motions. 2. Design process for improvement and design the method study. 3. Estimation of time for each operation through micro motion study so as to eliminate unnecessary movements. 4. Design the ergonomics for effective usage of hand and body motions
	IEPE 11	Applied Probability and Statistics	2018	<ol style="list-style-type: none"> 1. Basic concepts of sampling applied in population enumeration.

				<ol style="list-style-type: none"> 2. Regression techniques for application and forecast the demand and related variables 3. Testing of hypothesis using statistical distributions. 4. Correlation between the observed values and experimental values for analysis of variance.
	IEPE 12	Financial Management & Control	2018	<ol style="list-style-type: none"> 1. Clearly understand the cost management discipline and process 2. Recognise potential pitfalls and understand avoidance strategies 3. Use a cost management estimation and control plan 4. Understand the process and importance of Cost Estimation, Cost Budgeting and Cost Control
	IEPE 13	Human Resource Management	2018	<ol style="list-style-type: none"> 1. Critically evaluate and apply theories and models of HRM that explain the nature and significance of key HRM practices and HRM outcomes as they relate to diverse organisational contexts. 2. Critically analyse and apply the emerging strategic role that HRM plays in a changing business environment and workplace to maintain current policies and procedures 3. Analyse and align HR systems and processes to leadership strategies and objectives in contemporary organisations to promote best practice in HR performance.

				<p>4. Identify and evaluate key organisational approaches to improving HR outcomes for both the organisation and its employees</p> <p>5. Critically analyse employee-employer issues using relevant ethical and legal processes and approaches to solve problems.</p>
	IEPE 21	Design for Manufacturing	2018	<p>1. Design components for machining</p> <p>2. Simulate the casting design and choose the best casting process for a specific product.</p> <p>3. Evaluate the effect of thermal stresses in weld joints</p> <p>4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation mechanisms</p> <p>5. Design plastic components for machining and joining and selecting a proper processes for different joining cases</p>
	IEPE 22	Marketing Management	2018	<p>1. State the role and functions of marketing within a range of organizations.</p> <p>2. Describe key marketing concepts, theories and techniques for analysing a variety of marketing situations.</p> <p>3. Use written formats to communicate marketing outcomes.</p> <p>4. Apply the introduced conceptual frameworks, theory and techniques to various marketing contexts.</p> <p>5. Synthesise ideas into a marketing plan.</p>
	IEPE 23	Facilities Planning	2018	<p>1. Able to know the concept of facilities planning that aid in design of Product,</p>

				<p>Process and schedule design.</p> <p>2. Able to design Material handling equipment for industrial and non industrial purpose.</p> <p>3. Able to design handling, receiving and shipping of goods using computer aided layout software.</p> <p>4. Able to solve Problems of ware house, conveyor and allocation models using quantitative approach.</p> <p>5. Able to simulate the waiting line models, storage models and conveyor models using simulation software.</p>
	IECP 01	Industrial Engineering Lab-I	2018	<p>1. To pursue the method adopted in performing the operation.</p> <p>2. Understanding of reliable and flexible method to accomplish hectic task in minimum possible time.</p> <p>3. To record the human activities during working conditions using scientific methods.</p> <p>4. To study the performance rating of individual worker and to cost accordingly</p> <p>5. Development of new techniques to minimize the bottlenecks</p>
	IECP 02	Simulation Lab - I	2018	<p>1. Able to understand the basic programming knowledge with respect to domain.</p> <p>2. Able to develop a program to solve N job 2 machine problem using C software, and to develop a program in C to solve inventory price breaks problem</p> <p>3. Able to solve inventory control problem for Two Phase Method</p>

				<p>4. Able to solve queuing theory problems in Big M-Method.</p> <p>5. Able to solve linear programming and non-linear programming problems using Simplex Method</p>
	PGMC 01	Research Methodology and IPR	2018	<ul style="list-style-type: none"> • Understand research problem formulation. • Analyze research related information • Follow research ethics <ul style="list-style-type: none"> • Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. • Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. • Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
	IEPC 03	Advanced Operation Research	2018	<ol style="list-style-type: none"> 1. Able to solve nonlinear problems using Kuhn Tucker conditions. 2. Able to solve Un-constrained and

				<p>constrained minimization problems using programming methods.</p> <p>3. Ability to solve multi objective problems using Goal programming.</p> <p>4. Able to develop meta heuristic algorithms to solve optimization problems.</p>
	IEPC 04	Quality Control and Reliability Engineering	2018	<p>1. Able to know the concepts and methods of modern statistical quality control.</p> <p>2. Students learn to apply standard quality control tools, theoretical statistical concepts that justify the use of particular quality control tools in particular situations.</p> <p>3. They learn theory and methods for analyzing the performance of different quality control tools.</p>
	IEPE 31	Supply Chain Management	2018	<p>1. Managerial decision plans for effective implementation with competitive supplies</p> <p>2. Demand of the materials and maintain zero inventories with proper supply chain.</p> <p>3. Manufacturing operations and allocation of resources for optimal production.</p> <p>4. Proper sales market so as to plan the MRP and lean manufacturing concepts</p> <p>5. Logistics for purchasing raw materials and maintain continuous chain with suppliers and customers</p>
	IEPE 32	Project Management	2018	<p>1. Better understanding of the project principles and project life cycle so as to avoid the project delays and the design stage itself to arrive at the Break-even point</p> <p>2. Better analysis of the project planning, the role and responsibility of the team work</p>

				<p>in the assignment of jobs</p> <ol style="list-style-type: none"> 3. Organization structure the responsibilities and role of leaders and team management 4. Process of implementation of performance measurements for better productivity and project process control
	IEPE 33	Discrete Event System Simulation	2018	<ol style="list-style-type: none"> 1. Classify various simulation models and give practical examples for each category 2. Construct a model for a given set of data and motivate its validity 3. Generate and test random number variates and apply them to develop simulation models 4. Analyze output data produced by a model and test validity of the model 5. Explain parallel and distributed simulation methods
	IEPE 41	Productivity Engineering & Management	2018	<ol style="list-style-type: none"> 1. Identification and formulation productivity measurement at national level with diversity concepts 2. Development of suitable software for productive evaluation based on objective matrix and decision tree 3. Identification of long term and short term productive models in industry for improvement of the productivity 4. University-industry interaction for entrepreneurship development and technology transfer
	IEPE 42	Logistics Engineering & Management	2018	<ol style="list-style-type: none"> 1. An ability to apply the knowledge, techniques, skills, and modern tools of

				<p>the discipline to Engineering Logistics technology;</p> <p>2. An ability to apply knowledge of engineering, management and technology to Engineering Logistics related issues;</p> <p>3. An ability to identify analyse and solve Engineering Logistics related issues;</p> <p>4. An ability to identify, analyse, and solve narrowly defined Engineering Logistics technology problems;</p> <p>5. An ability to apply written, oral, and graphical communications in both technical and non-technical environments and an ability to identify and use appropriate technical and management literature;</p>
	IEPE 43	Service Engineering & Management	2018	<p>1. Able to acquire knowledge on focusing on customer and service management</p> <p>2. Able to manage modern control system, BPO and Services marketing</p> <p>3. Able to maintain good customer relationship, data mining knowledge management</p> <p>4. Able to apply utility theory, simulation modeling in management science applications.</p>
	IECP 03	Industrial Engineering Lab-II	2018	<p>1. Understand the forecasting techniques.</p> <p>2. Understand the control charts for variables and attributes.</p> <p>3. Understand the development of bills.</p>

				<p>4. Understand the processing the charts.</p> <p>5. Understand the utilization of work sampling.</p>
	IECP 04	Simulation Lab - II	2018	<p>1. Understand the concept of PERT, Transportation and Queuing models.</p> <p>2. Understand the solving of sequencing and assignment problem.</p> <p>3. Understand the Taguchi and response Surface Methodology using DOE.</p> <p>4. Understand the single & multi response optimization.</p>
	IEPE 51	Design and Analysis of Experiments	2018	<p>1. Formulate objective(s) and identify key factors in designing experiments for a given problem.</p> <p>2. Develop appropriate experimental design to conduct experiments for a given problem.</p> <p>3. Analyze experimental data to derive valid conclusions.</p> <p>4. Optimize process conditions by developing empirical models using experimental data.</p> <p>5. Design robust products and processes using parameter design approach.</p>
	IEPE 52	System Dynamics	2018	<p>1. Ability to develop students' skills in analyzing, simulating, and identifying dynamic systems based upon their input-output responses.</p> <p>2. Develop and analyze a simulation model that provides a useful explanation of a given problematic behaviour in a narrowly-defined task</p>

				3. Able to compare popular social science modeling paradigms such as research economics and cross impact theory
	PGOP 13	Operation Research	2018	<p>1. Students should able to apply the dynamic programming to solve problems of discreet and Continuous variables.</p> <p>2. Students should able to apply the concept of non-linear programming</p> <p>3. Students should able to carry out sensitivity analysis</p> <p>4. Student should able to model the real world problem and simulate it.</p>
	PGOP 16	Waste to Energy	2018	<p>1. Need and analysis of non-conventional energy sources and the processes of energy conservation.</p> <p>2. Harnessing the solar energy, storage devices so as to produce electricity; ways for energy distribution.</p> <p>3. Understand the issue of fuel availability and analyse the supply and demand of fuel at the national level</p> <p>4. Comparison of the coal-fired power plant with the non-conventional energy utilization to reduce environmental pollution. Working principle of carnot cycle for maximum efficiency, need for power generation systems with thermodynamic concepts.</p>

M.Tech- (Production Engineering):

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
	PEPC 01	Advanced Manufacturing Processes	2018	<ol style="list-style-type: none">1. Students can able to demonstrate different unconventional machining processes2. Able to test the influence of different process parameters on the performance and their applications3. Able to select the different types of composites for different applications
	PEPC 02	Advanced material technology	2018	<ol style="list-style-type: none">1. Students are capable to define the concept of materials i.e., conventional materials with their structure, such as electronic configuration, structure of atom, etc.2. Students become aware of different conventional materials such as metallic and non metallic materials, structures and their applications.3. Students will be able to demonstrate the need for newer materials by comparing the limitations of conventional materials.4. They will be able to compare the types of newer materials along with their properties and applications.5. They will be able to compile about the properties, structure of ceramic materials and their need for newer applications and processing techniques.
	PEPE 11	Applied Probability and Statistics	2018	<ol style="list-style-type: none">1. Basic concepts of sampling applied in

				<p>population enumeration.</p> <p>2. Regression techniques for application and forecast the demand and related variables</p> <p>3. Testing of hypothesis using statistical distributions.</p> <p>Correlation between the observed values and experimental values for analysis of variance</p>
	PEPE 12	Operations Planning and Control	2018	<p>1. Forecasting principles and techniques for short range and long range planning</p> <p>2. Production requirements for each product and plan the shop floor activities</p> <p>3. Work station loading and scheduling of paths to avoid bottle necks for smooth production</p> <p>4. Solution for product mix decision using OR techniques.</p> <p>5. Optimal job sequences to achieve the minimum make span with maximum production output</p>
	PEPE 13	Advanced Casting Technology	2018	<p>1. Knowing and identification of materials for moulding the additives, coating and the methods of sand controls</p> <p>2. Identification of different furnaces for metal melting and design the suitable furnace depending materials</p> <p>3. Understanding of the concepts related to the casting processes and the factor those influence the design process for metals and alloys</p> <p>4. Knowing the various properties of liquid metals and their compositions and attain the</p>

				<p>various alloys depending upon the temperature, Iron-carbon diagram</p> <p>5. Understanding the principles of mechanization of foundries with their layouts and purchase of suitable layout</p>
	PEPE 21	Robotics	2018	<ol style="list-style-type: none"> 1. Importance of robotics in today and future goods production 2. Robot configuration and subsystems 3. Principles of robot programming and handle with typical robot 4. Working of mobile robots 5. The Student must be able to design automatic manufacturing cells with robotic control using the principle behind robotic drive system, end effect ors, sensor, machine vision robot kinematics and programming
	PEPE 22	Design for Manufacturing	2018	<ol style="list-style-type: none"> 1. Design components for machining. 2. Simulate the casting design and choose the best casting process for a specific product. 3. Evaluate the effect of thermal stresses in weld joints. 4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation mechanisms. 5. Design plastic components for machining and joining and selecting a proper processes for different joining cases.

	PEPE 23	Metrology & Computer	2018	<ol style="list-style-type: none"> 1. Metrology, quality control and Inspection so that they can meet the challenges in the industries. 2. Various instruments and measuring systems with the help of laser and other advanced computer integrated systems. 3. Students will be able to measure any type of features, forms with the help of CMM.
	PECP 01	Production Engineering Lab – I	2018	
	PECP 02	CAD Lab	2018	<ol style="list-style-type: none"> 1. Describe the geometry of single point cutting tool. 2. Apply knowledge of metal cutting to perform various machining operations. 3. Explain the working and use of various components of conventional machine tools. 5. Identify the sequence of operation to process a job.
	PGMC 01	Research Methodology and IPR	2018	
	PGPA 01	Audit Course-I	2018	
	PEPC 03	Computer Integrated Manufacturing	2018	
	PEPC 04	Metal Cutting Tool Design	2018	
	PEPE 31	Automation Manufacturing	2018	
	PEPE 32	Metal Forming Technology	2018	

	PEPE 33	Additive Manufacturing	2018	
	PEPE 41	Energy Management	2018	
	PEPE 42	Advanced Welding Processes	2018	
	PEPE 43	Oil Hydraulics and Pneumatics	2018	
	PECP 03	Production Engineering Lab-II	2018	
	PECP 04	CAM Lab - II	2018	
	PGPA 02	Audit Course-II	2018	
	PEMP 01	Mini Project	2018	
	PEPE 51	Finite Element Methods	2018	
	PEPE 52	Expert Systems in Manufacturing	2018	
	PGOP 11	Business Analytics	2018	
	PGOP 12	Industrial Safety	2018	
	PGOP 13	Operation Research	2018	
	PGOP 14	Cost Management of Engineering Projects	2018	
	PGOP 15	Composite Materials	2018	
	PGOP 16	Waste to Energy	2018	
	PEPD 01	Major Project: Phase-I Dissertation	2018	
	PSPD 01	Major Project: Phase-I Dissertation	2018	

2.6.1: The institution has stated learning outcomes (generic and programme specific)/graduate attributes which are integrated into the assessment process and widely publicized through the website and other documents

2017-2018

SVU COLLEGE OF ARTS

1. Adult & Continuing Education

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1	MAAE -1.1	Alternative Learning Systems	2017	<ul style="list-style-type: none"> ➤ Remembrance of different forms of learning. ➤ Application of different technology support services for effective learning. ➤ Organization and administration of nonformal education programmes. ➤ Evaluation of nonformal education programmes.
2	MAAE-1.2	Policy Studies In Adult/Continuing Education	2017	<ul style="list-style-type: none"> ➤ Identify the socio-political movements during pre-independence period for the promotion of literacy. ➤ 2.Analyze the trends of adult education programmes during post-independence period from social education to saakshar Bharat Mission. ➤ 3.Describe the National and International organizations efforts for the promotion of literacy at various levels. ➤ 4.Ex plain the State & Central Govt policies on adult education and

				special reference to literacy, post-literacy and continuing education.
3	MAAE-1.3	Adult Psychology And Learning	2017	<ul style="list-style-type: none"> ➤ 1: Acquire knowledge on psychological foundations and its relevance to Adult Education and Learners. ➤ 2: Learn classification of motives and motivation techniques to motivate the Adult Learner. ➤ 3: Compare the Adult Personality & Child personality based on three Domain principles. ➤ 4: Examine the Adult Learning characteristics and theories of learning, eventually he/she will apply all aspects in adult class room activity.
4	MAAE-1.4	Socio-Philosophical Foundatons Of Adult Education	2017	<ul style="list-style-type: none"> ➤ Create thinking capacity to survival in the present society with philosophical approach. ➤ Know great eminent leaders biography, sacrifices their lives for society. ➤ Aware Dalit movement, women movement, co-operative movement in society especially rural areas. ➤ Examine the problems of society with reference to bonded labor, child labour, untouchability, transgender and provide awareness on human rights.
5	MAAE-1.5	Communication Methods in Adult Education	2017	<ul style="list-style-type: none"> ➤ Remembering the concept and methods of communication and their application to adult Education ➤ Identifying different models of communication.

				<ul style="list-style-type: none"> ➤ Describing the media of communication and their utility in continuing education. ➤ Realising the use of different Audio-visual aids in teaching learning process.
6	MAAE-1.6	Human Values And Professional Ethics-I	2017	<ul style="list-style-type: none"> ➤ know the importance of professional ethics and to implement the ethical values in various professions. ➤ understand about the Good and bad values and to analyze the basic moral concepts. ➤ inculcate the students in the aspects of pursharthas . ➤ 4. Know different crimes and its impact on personal and social life and theories of punishment
7	MAAE-2.1	Recent Trends In Adult And Continuing Education	2017	<ul style="list-style-type: none"> ➤ .Identify the variations of literacy growth among States and Nation with reference to gender, rural and urban. ➤ 2.Recognize the functions, activities of JSS and Saakshar Bharat Mission, to promote Life Long learning. ➤ 3. Understand the five-year plan period programmes in terms of literacy, non-formal and functional literacy. ➤ 4. Examine the significance of the extension activities as third dimension of literacy programmes at field level.
8	MAAE-2.2	Curriculum And Methods Of Literacy Teaching	2017	<ul style="list-style-type: none"> ➤ Remembering the meaning, foundations and theories of curriculum development with reference to adult learners. ➤ Distinguishing different principles and approaches of curriculum

				<p>development.</p> <ul style="list-style-type: none"> ➤ Interpreting the needs and interests of lifelong learners. ➤ Executing to evaluate Adult Education programmes
9	MAAE-2.3	Research Methods In Adult Education	2017	<ul style="list-style-type: none"> ➤ Understanding the concepts and methods of research. ➤ Adopting the suitable sampling methods for research studies. ➤ Developing tools for research studies. ➤ Ability of research report writing.
10	MAAE-2.4	Field Work & Practical Assignments	2017	<ul style="list-style-type: none"> ➤ Application of knowledge and skills in project designing ➤ Ability to do research work. ➤ Finding solutions to the problems identified in his research work. ➤ Preparing the research report.
11	MAAE-2.5	Management Of Adult/Continuing Education	2017	<ul style="list-style-type: none"> ➤ Know the principles of Management, Planning and Organizing capacity to conduct Adult Education Programmes. ➤ Develop Social and Communication Skills to organize village, Mandal, District, State and Central level programmes. ➤ Acquire project techniques for sustainable programmes. ➤ Learn and enhance research skills to write project report, monitoring and evaluation of data of Adult Education Programme.
12	MAAE-2.6	Human Values And Professional Ethics-Ii	2017	<ul style="list-style-type: none"> ➤ Understand and recognize the importance of Value Education & Human Values and also try to follow the traditional values of family, women and elders in the society.

				<ul style="list-style-type: none"> ➤ Examine code of ethics for medical and health care professionals. They Can sensitize the rural people on Health Issues & Problems. ➤ Explain the Environmental Protection and relationship between Man and Nature, causes of pollution and impact on environmental health. ➤ Recognize the need of Social ethics and fight against the anti-social activities, Organ trade, Human trafficking etc.
13	MAAE-3.1	Training In Adult And Continuing Education	2017	<ul style="list-style-type: none"> ➤ Identify the importance of training in Adult and Continuing Education programmes and differences between training and education. ➤ Know the training methods, training materials to organize the Adult and Continuing Education programmes. ➤ Follow the teaching methods like Lecture, discussion, demonstration and Role Play methods. ➤ Recognize training facilities at different levels like National, State, District and Local.
14	MAAE-3.2	Comparative Studies In Adult Education	2017	<ul style="list-style-type: none"> ➤ Compare the Adult Education Programmes of different countries based on its aims and significance. ➤ Compare and contrast of Adult Education movement and progress in different countries like UK, USA, Denmark etc with reference to India. ➤ Find out the similarities and dissimilarities of Adult Education

				<p>Programs in selected countries.</p> <ul style="list-style-type: none"> ➤ Identify the problems of Adult Education in terms of Planning, Organization and Budget activities in developing countries and India.
15	MAAE-3.3	Material Development For Adult And Continuing Education	2017	<ul style="list-style-type: none"> ➤ Identify the significance of learning materials in Adult Education classes. ➤ Design the teaching learning activity objectives for better performance of Teacher educator in Adult Education Programmes. ➤ Enhance language forms and competence and tune with the needs of the learner. ➤ Develop teaching learning materials for self-learning
16	MAAE-3.4a	Peoples' participation And Development	2017	<ul style="list-style-type: none"> ➤ Analysing the role and functions of people committees, ➤ Understanding the functions of Panchayat Raj institutions. ➤ Knowledge on the role of co-operatives in rural development. ➤ Ability to catalyse the performance of PRIs and co-operatives.
17	MAAE-3.4b	Vocational Education And Skill Development	2017	<ul style="list-style-type: none"> ➤ Identify the relationships of Vocational Education and Adults development. ➤ Understand the institution training importance and its practices in vocational training. ➤ Identify the issues of Rural Vocational training in India and Asian Countries.

				<ul style="list-style-type: none"> ➤ Provide Vocational Guidance and Counselling for Adult trainees.
18	MAAE-3.4c	Guidance And Counselling In Adult And Continuing Education	2017	<ul style="list-style-type: none"> ➤ Remembering the concept and theories and perspectives of guidance and counselling in educational process. ➤ Recollecting understanding and analysis of educational problems of a clientele group. ➤ Knowing the roles and functions of guidance counsellor. ➤ Analysing the use of computers and internet in guidance and counselling.
19	MAAE-4.1	Monitoring And Evaluation	2017	<ul style="list-style-type: none"> ➤ Identify the concept of monitoring and monitoring systems in adult education ➤ 2.Describe the different evaluation models. ➤ 3.Demonstrate the tools and techniques of evaluation. ➤ 4.Understand the importance of learner evaluation.
20	MAAE-4.2	Human Resource Development And Management In Lifelong Learning	2017	<ul style="list-style-type: none"> ➤ Understand the importance of human resource development and its historical background. ➤ Analyze the human capital and its functions in Adult Education. ➤ Explain the cost benefit process and problems of measurements. ➤ Identify the need of planning in human resource development and relation to Adult Education.
21	MAAE-4.3a	Environment And Education	2017	<ul style="list-style-type: none"> ➤ 1.Understand the fundamental aspects of environment and need of environmental protection.

				<ul style="list-style-type: none"> ➤ 2: Interpret the environmental crisis with reference to pollutions and its impact of human life need of Environmental Conservation. ➤ 3: Know the environmental laws and role of individual and community to Control environmental pollution. ➤ 4: Explain Ecology and eco factors for Ecological Balance.
22	MAAE-4.3d	Population Education	2017	<ul style="list-style-type: none"> ➤ Recollecting the concepts, needs and importance of population related terminologies. ➤ Analysing the causes and consequences of population growth. ➤ Distinguishing the roles of different agencies in promotion of population education and control. ➤ Identifying the different National population policies and influences fertility, mortality and migration.
23	MAAE-4.4	Dissertation / Project Work	2017	<ul style="list-style-type: none"> ➤ Application of knowledge and skills in project designing ➤ Ability to do research work. ➤ Finding solutions to the problems identified in his research work. ➤ Preparing the research report.

2. Ancient Indian History, Cultural Archeology

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	AIHC&A-101	History of Ancient India upto 550 A.D.	2017	<ul style="list-style-type: none"> ➤ Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto 550 C.E. ➤ Student will also be well versed with different analytical approaches
2	AIHC&A-102	History of India from 1206 A.D. to	2017	<ul style="list-style-type: none"> ➤ Students can familiarize in understanding the continuity with changes in all spheres of history and culture under the Delhi sultanates. ➤ Students can able to assess the contribution of sultanates to Indian
3	AIHC&A-103	History of Andhras upto 1323 A.D.	2017	<ul style="list-style-type: none"> ➤ The study of comprehensive history of the country is incomplete without the study of regional history. ➤ Regional history is becoming more and more popular, for it has inherit potential of tapping varied kinds of sources for understanding the divergent aspects of local heritage and culture. ➤ The students can develop thorough understanding on Ancient
4	AIHC&A-104	Ancient World Civilizations.	2017	<ul style="list-style-type: none"> ➤ Students gain familiarity with the rise and characteristic features of the ancient world ➤ Civilizations, its regional extent and variation ➤ Students can understand the glory of the civilizations, the nature of its

5	AIHC&A- 105	(A) Principles and Methods of Archaeology.	2017	<ul style="list-style-type: none"> ➤ Students can develop a strong foundation on the basic understanding of the nature, fundamentals, development and value of archaeology as a discipline. ➤ Familiarized with basic descriptive technique and preliminary study of various categories of objects and the practical methods of doing Archaeological work
6	AIHC&A- 105 B	(B) Advanced Archaeological Theory and Research Methodology	2017	<ul style="list-style-type: none"> ➤ The student will be able to understand the basic features of various theories and thoughts used in archaeological interpretations. ➤ They can formulate a research proposal and decide on appropriate materials and methods of analysis. ➤ They can present the findings and the process of conducting research in written and verbal formats. ➤ Students get acquainted with various developmental phases of the Indian social institutions and their significance in human life and values ➤ It helps to understand the concepts of Political institutions in Ancient India and their significance.
7	Elective foundation 106	A) SOCIAL AND POLITICAL INSTITUTIONS IN ANCIENT	2017	<ul style="list-style-type: none"> ➤ Students get acquainted with various developmental phases of the Indian social institutions and their significance in human life and values ➤ It helps to understand the concepts of Political institutions in Ancient India and their significance.

8	AIHC&A- 107	Human Values and Professional Ethics- I.	2017	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at
9	AIHC&A- 201	History of India from 550 A.D to 1206 A.D.	2017	<ul style="list-style-type: none"> ➤ Students can develop comprehensive knowledge on political, social, economic, religious and cultural history of early medieval India , regional polities and its impact ➤ Students can also able to understand the circumstances lead to the invasions of ➤ Arabs and foundation of Muslim rule in India.
10	AIHC&A- 202	History of Medieval India from 1526 A.D to 1707 A.D.	2017	<ul style="list-style-type: none"> ➤ Students can understand thoroughly the Mughal conquest of India, their rule and legacy. ➤ The study help the students to assess the achievements and contribution of Mughals to Indian history and culture
11	AIHC&A- 203	History of South India from 1323 A.D. to 1724 A.D.	2017	<ul style="list-style-type: none"> ➤ This course provides comprehensive knowledge on the last imperial political formation in South India and the history of Vijayanagara, Bahmani and contemporary pretty powers. ➤ It helps to understand with the context of polity, economy, culture, religious and ideological changes

12	AIHC&A- 204	Pre and Proto Historic Cultures of India	2017	<ul style="list-style-type: none"> ➤ Students will develop a strong foundation and critical understanding of the pre-proto cultures of India ➤ They will be able to situate Indian materials within wider archaeological debates
13	AIHC&A- 205 (A) AIHC&A- 205 (B)	(A) History of Indian Archaeology (B) Cultural Heritage Management	2017	<ul style="list-style-type: none"> ➤ Students will familiarize in understanding the history of archaeological studies and its progress from its inception up to recent trends. ➤ Help the students in assessing the services rendered by pioneers of archaeologists ➤ It also helps to understand archeological studies in pre and post Independence and emergence of various branches. ➤ Students can understand well the concept of cultural heritage, world and heritage monuments in India conservation and promotion of
14	AIHC&A- 206 (A)	(A)India's Early Cultural Contacts with other Countries	2017	<ul style="list-style-type: none"> ➤ Cross regional cultural diffusion has been an important aspect of historical evolution. ➤ A strong and vibrating civilization having its impact felt upon other contemporary cultures has been a common phenomenon of history ➤ The students were able to understand the influence of Indian culture on Central ➤ Asia, south east asia, Japan, Tibet, Persia, Greece, Rome, Indo- China ➤ Students can be able to understand thoroughly the Early History of

15	AIHC&A- 206(B)	B) Early History of South East Asia	2017	<ul style="list-style-type: none"> ➤ Students can be able to understand thoroughly the Early History of South East asia ➤ the contacts between India and South East Asia in terms of Cultural, religions and economic exchanges ➤ Student can be well versed in assessing the India's early cultural contacts and its influence in South East Asia
16	AIHC&A -207	Human Values and Professional Ethics- II	2017	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at large.
17	AIHC&A- 301	History of Indian Architecture	2017	<ul style="list-style-type: none"> ➤ Students will able to understand the evolution of architecture in India and their ➤ transformation through the ages in their religious, regional and stylistic context. ➤ Can gain theoretical knowledge about the basic philosophy, fundamental aspects and multifaceted nature of Architecture.

18	AIHC&A- 302	Epigraphy	2017	<ul style="list-style-type: none"> ➤ Students will be able to understand the profession knowledge on decipher and read scripts; assess the date of inscriptions with the help of paleographic features. ➤ Able to understand the different languages used in inscriptions,
19	AIHC&A- 303(A)	(A) History of Modern Andhra from 1724 A.D. to 1956 A.D.	2017	<ul style="list-style-type: none"> ➤ The students can understand the history of Andhra as well the history of Hyderabad state under company and crown rule. ➤ Assess the role of Andhras in the freedom movement ➤ Acquire thorough knowledge on the causes and course of the
20	AIHC&A- 303(B)	(B) Historiography and Historical Method	2017	<ul style="list-style-type: none"> ➤ It provides a critical overview of one of the most dynamic areas of modern historical inquiry—global history. ➤ The students can familiarize with historical studies, the theories and methods used in the practice of history writing. ➤ Students also gain foundation knowledge on Historical Methods
21	AIHC&A- 303(C)	(C) Laboratory Methods in Scientific Archaeology	2017	<ul style="list-style-type: none"> ➤ Students are familiarized with basic descriptive technique and Preliminary study of various categories of objects studied by archaeologists, such as lithics, pottery, plant fossils, human remains, rocks and minerals sediments, map reading
22	AIHC&A- 303(D)	(D) Temple Studies	2017	<ul style="list-style-type: none"> ➤ Students can be familiar in understanding the temple culture, knowledge on the forms of worship, origin and development of image worship, temples and their role in social, economic, religious, cultural history and professional groups involved in its functions and

23	AIHC&A -304	Soft Skills in Archaeology	2017	<ul style="list-style-type: none"> ➤ The students can acquire knowledge on the basics of computer and its usage in general ➤ They can expertise the working skills in computational archaeology and be able to equip for future research and enhance employability.
24	AIHC&A- 305(A)	(A) Outlines of Indian History	2017	<ul style="list-style-type: none"> ➤ The non-history students as an external elective course become familiar in understanding the broad phases of Indian history and culture
25	AIHC&A- 305(B)	(B) Women in Indian History	2017	<ul style="list-style-type: none"> ➤ The students can acquire knowledge course on the sources for the study of women history, their role in social and religious movements since the ages, progress of education, economy their role in cultural institutions and analyses women centered issues with historical context
26	AIHC&A- 401	History of Indian Art	2017	<ul style="list-style-type: none"> ➤ Students become familiar with the monuments and their sculptures, art forms, features, styles and art schools of India during the period covered in the course.
27	AIHC&A- 402	Numismatics	2017	<ul style="list-style-type: none"> ➤ Students will be able to identify and decipher the coins. ➤ They will also be able to understand the socio-political background that accurse through the coinage of that time; thus getting holistic picture of economic and monetary system prevalent

28	AIHC&A- 403(A)	(A) Museology	2017	<ul style="list-style-type: none"> ➤ Students can learn the basic nature, functions of museums and their activities. ➤ The students were able to acquire the essential skills and knowledge needed for Museum profession
29	AIHC&A- 403(B)	(B) Historical Applications in Tourism	2017	<ul style="list-style-type: none"> ➤ The students can familiarize the knowledge needed to excel in tourism activities. ➤ It will equip the students with the solid foundation to build upon the fundamentals, useful skills and expertise that can assist employment in Tourism Industry
30	AIHC&A- 403(C)	(C) Tour Guiding and Management	2017	<ul style="list-style-type: none"> ➤ The students can familiarize the knowledge needed to tourism guide activities. ➤ It will equip the students with the solid foundation to build upon the fundamentals of tour guide, useful skills and expertise that can assist employment in Tourism Industry

31	AIHC&A- 403(D)	(D) Conservation of Cultural Property	2017	<ul style="list-style-type: none"> ➤ The student can equip with various methods and techniques followed in the Conservation and Preservation of Cultural Property. ➤ The students were able to possess the essential skills and knowledge that can assist employment in Archaeology and museum as conservator
32	AIHC&A- 404	History of Science and Technology in Ancient India	2017	<ul style="list-style-type: none"> ➤ Students will be able to understand the history of science and technology and its progress through the ages, introduction and impact of the stone and metal ages and nature of scientific developments in ancient India. ➤ They also acquire the knowledge on the history of Mathematical Sciences and Ayurveda

33	AIHC&A- 405(A)	(A) Introduction to Indian Archaeology	2017	<ul style="list-style-type: none"> ➤ The external elective students can acquire the knowledge about the importance of archeological studies, its relevance to other sciences. ➤ Will become familiar to understand the importance of epigraphy and numismatics in the reconstruction of history
34	AIHC&A- 405(B)	(B)History of Vijayanagara Empire	2017	<ul style="list-style-type: none"> ➤ The non-history student as an external elective can familiar in understanding the history of Vijayanagara empire and their contribution to south Indian culture

3.Area Studies Programme

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
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1	SEAPS-101	Early Cultural History of Southeast Asia	2017	<p>Students understand the causes for the spread of Indian culture in Southeast Asia</p> <p>Know the different Indian dynasties of the past in Southeast Asia</p> <p>Students will be able to learn the impact of Indian cultural on</p>
2	SEAPS-102	Regional Geography of Southeast Asia	2017	<p>Students understand geographical profile of different countries of Southeast Asia.</p> <p>Know the trends in population movement within Southeast Asia</p> <p>Students will be able to assess location significance and various infrastructural developments</p>
3	SEAPS-103	Colonization of Southeast Asia	2017	<p>Students will have adequate knowledge on rise and fall of Portuguese</p> <p>Students differentiate the colonial powers that ruled Southeast Asia</p> <p>Critically observe Thailand's Political, Economic transformation and maintaining independence</p>
4	SEAPS-104	Ancient Indian History up to 1206 A.D.	2017	<p>Students comprehend ancient Indian History, Indus Valley Civilization, Vedic Culture and Jainism and Buddhism. Know the rise of different Dynasties and contribution to Indian Culture. Gain knowledge on various Muslim Invasions and affects</p>
5	SEAPS-105	Modern European History, 1870-1991	2017	<p>Differentiate volatile political situation in Europe</p> <p>Earn broad understanding of Bismarck and consolidation of the</p>

6	SEAPS-106	Human Values and Professional Ethics-I	2017	<ul style="list-style-type: none"> ➤ Students understand the causes for the spread of Indian culture in Southeast Asia. ➤ Know the different Indian dynasties of the past in Southeast Asia. ➤ Students will be able to learn the impact of Indian cultural on Southeast Asian societies
7	SEAPS-201	Contemporary Cultural History of Southeast Asia	2017	<p>Students list the Christian Missionary activities in Southeast Asian countries.</p> <p>2) Knows the factors of Indian Emigration, and Chinese economic contribution in Southeast Asia.</p> <p>Comprehensive grasp over different cultures and religions in Southeast</p>
8	SEAPS-202	Modern History of China, 1839-1976	2017	<p>Students know Western contacts, rebellions and reforms in China</p> <p>Advanced understanding on Sun Yat Sen, Chiang Kai-Shek and Mao Tse-Tung</p> <p>Distinguish Reconstruction and Consolidation of China and its foreign relations</p>

9	SEAPS-203	Regional Geography of South Pacific & East Asia	2017	<p>Students identify physical setting, landforms, climate and soils of South Pacific.</p> <p>Comprehend on Australia, New Zealand, Japan and China</p> <p>Recognize the economic trends in South Pacific and East Asian nations</p>
10	SEAPS-204	Medieval Indian History 1206 A.D.–1707 A.D	2017	<p>Students will gain knowledge on Major dynasties of Medieval India</p> <p>Students know the great Indian rulers of Medieval period</p> <p>Students comprehend the advent of Europeans</p>
11	SEAPS-205	Modern Indian History 1757-1965	2017	<p>Students understand Indian sub-Continent and the Europeans arrival</p> <p>2) Students distinguish the causes for the rise of nationalism and various phases of Independence movement.</p> <p>3) Gain adequate knowledge on Gandhian Era, Independence and post independent-India</p>
12	SEAPS-206	Human Values and Professional Ethics-II	2017	<p>Understand causes for the rise of nationalism and movements in different Southeast Asian countries</p> <p>Earn knowledge on the Japanese Occupation of Southeast Asia during the Second World War</p> <p>Analyze the course Course and outcome of Nationalist movements in</p>

13	SEAPS-301-A	a) Nationalism in Southeast Asia	2017	<ul style="list-style-type: none"> ➤ Understand causes for the rise of nationalism and movements in different Southeast Asian countries ➤ Earn knowledge on the Japanese Occupation of Southeast Asia during the Second World War
14	SEAPS-301-B	b) Indochina (Cambodia, Laos & Vietnam) 1802-2000	2017	<ul style="list-style-type: none"> ➤ Students will learn early Western contacts and establishments of French protectorates over Indochina states. ➤ Gain knowledge on French Administration and freedom movements in Indochina. ➤ Knows global politics during Cold War and its effects on
15	SEAPS-301-C	c) Geopolitics of Asia-Pacific Region	2017	<ul style="list-style-type: none"> ➤ Students will understand the meaning of geopolitics ➤ Essence of Cold War will be understood thoroughly ➤ Will learn about Post Cold War politics
16	SEAPS-302-A	a) Modern History of Japan 1854-1975	2017	<ul style="list-style-type: none"> ➤ Students acquaint knowledge on Opening of Japan and its early western contacts. ➤ Knows Japan's militarization, Russo Japanese war and the First World War ➤ Gain knowledge on US Occupation of Japan and Post World War-II

17	SEAPS-302-B	b) East Asian Developments – Post Cold War	2017	<ul style="list-style-type: none"> ➤ Comprehend on the disintegration of Soviet Union and Emergence of New World Order. ➤ Ability to analyze security concerns in the post Cold War and perceptions of China, Japan and North Korea.
18	SEAPS-302-C	c) Indian Diaspora	2017	<ul style="list-style-type: none"> ➤ Know the reasons of Indian migration to Southeast Asian countries. ➤ Learn Indian migrant’s socio-economic contribution to host nations. ➤ Focus on the role of Indian Diaspora in National Reconstruction and image building in host countries
19	SEAPS-302-D	d) International Relations	2017	<p>Students know the meaning, nature and scope of International Relations</p> <p>2) Gain knowledge on the Cold War and New International Economic Order.</p>
20	SEAPS-303-A	(a) India and the World	2017	<p>Develop understanding of Non-Aligned Policy under Jawaharlal Nehru and Indira Gandhi</p> <p>2) Build knowledge on India’s Role in the United Nations</p> <p>3) Advance understanding on India’s relations with the US,</p>

21	SEAPS-303-B	(b) Emerging Asia and the World	2017	<ul style="list-style-type: none"> ➤ Develop understanding of Economic and Social Progress in Asia and also Economic crisis and Recovery of Asia ➤ Comprehensive grasp over Foreign Direct Investments in Asia, Rise of China and also about India's Look East Policy. ➤ Comprehend on Regionalism and regional organizations like
22	SEAPS-401-A	a) Regional Cooperation in Southeast Asia	2017	<p>) Students learn about early organizations like ASA, SEATO and MAPHILINDO.</p> <p>2) Develop understanding on the evolution of ASEAN from 5 to 10 members</p> <ul style="list-style-type: none"> ➤ 3) Focus on the ASEAN Summit Meetings, ARF and AFTA
23	SEAPS-401-B	b) Economic Landscape of Asia-Pacific	2017	<p>Develop an understanding of the rise of industrial economies like Singapore, Malaysia, Thailand and Indonesia.</p> <p>Comprehend of the economies of Australia and New Zealand</p> <p>Ability to know the Regional Economic Groups like ASEAN, ESCAP, APEC and EAS</p>

24	SEAPS-401-C	c) Energy, Environment and Sustainable Development	2017	<p>Develop an understanding of the Types of energy sources in the world and India</p> <p>Learn about environment issues and emerging green technologies</p> <p>Know the need of Renewable Energy, Green Energy, Bio-Diversity and eco systems</p>
25	SEAPS-402-A	a) Post-Cold War World order	2017	<p>Develop an understanding of the Cold War and Non-Aligned Movement.</p> <p>2) Students gain knowledge on Globalization and Multi National Companies.</p> <p>3) Differentiate Regional and Multilateral Cooperation and the roles of ASEAN and SAARC</p>
26	SEAPS-402-B	b) South Pacific Cultures	2017	<p>Students will learn about the definition of culture</p> <p>2. Will be able to learn about different societies in South Pacific</p> <p>➤ 3. Can identify different ethnic minorities in South Pacific</p>

27	SEAPS-402-C	c) Developing Blue Economy	2017	<p>Acquainted with the Blue Economy, Marine Governance and Ocean Technologies.</p> <p>2) Gain knowledge on ports and shipping, oceanic resources and marine bio-technology.</p> <p>3) Develop an understanding on Renewable Ocean Energy and its Importance.</p>
28	SEAPS-402-D	d) History of the USA from 1766-1963	2017	<p>Learn about American war of Independence</p> <p>2. Develop knowledge on the roles of Presidents of the USA</p> <p>3. Learn the causes for the Civil War, Abraham Lincoln and era of American Imperialism.</p>
29	SEAPS-403-A	(a) India-Australia Relations	2017	<ul style="list-style-type: none"> ➤ Learn about Littoral States of Indian Ocean and Complementarities between India-Australia ➤ Ability to analyze Political Issues and security concerns of both nations. ➤ Comprehend on the Post Cold War initiatives, strategic and security concerns

30	SEAPS-403-B	(b) History of Modern Andhra Pradesh 1800-195	2017	<ul style="list-style-type: none"> ➤ Students will learn about different dynasties that ruled Andhra Region ➤ Formation of Andhra in 1953 will be studied ➤ Students will study about Jai Andhra Movement
31	SEAPS-402	6	2017	<ul style="list-style-type: none"> ➤ Develop an understanding of the rise of industrial economies like Singapore, Malaysia, Thailand and Indonesia. ➤ Comprehend of the economies of Australia and New Zealand. ➤ Ability to know the Regional Economic Groups like ASEAN, ESCAP, APEC and EAS.

TOURISM:

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	T 101	Theoretical Concepts of Tourism	2017	<p>Understand the Nature, Meaning and Scope of Tourism.</p> <p>Students understand the different aspects in tourism.</p> <p>Earn knowledge about national and international tourism organisations</p>

2	T 102	Planning and Development of Tourism	2017	Learn about organized planning in the tourism industry. Gain knowledge on the resolutions of state governments towards tourism in their states. Know the significance of planning policies of international institutions
3	T 103	Indian Heritage and Culture	2017	Students will be in a position to distinguish between different art forms in India. Colonial Heritage of India is one of the important aspects in Indian Tourism.Importance of different religions in India and
4	T 104	Art and Architecture of North India	2017	Understand briefly the different art forms in India. Students understand and distinguish different types of architecture.Learn about most famous forts and palaces in India
5	T 105	Cultural Tourism in India	2017	Students gain knowledge on Indian culture Evaluate the cultural resources to utilize as a tourism products. . Interpret the techniques of handicrafts
6	T 106	Human Values and	2017	

7	T. 201	Historical Application Of Tourism In India	2017	<p>Students know historical development of tourism in India</p> <p>2) Categorize important tourism linkages and destinations.</p> <p>3) Gain knowledge on major tourist circuits</p>
8	T 202	Tourism Management	2017	<p>Demonstrate managerial skills and to manage the Tourism environment</p> <p>Apply the marketing skills and understanding demand and supply.</p> <p>Acquire skills of using Human Resources in Tourism Development</p>
9	T 203	World Tourism Geography	2017	<p>Gain knowledge on the influence of geography on Tourism.</p> <p>Examine and learn the use of geographical tools</p> <p>Know the important definitions and destinations</p>
10	T 204	Art and Architecture of South India	2017	<p>Understand briefly the different art forms in India</p> <p>Students understand and distinguish different types of architecture.</p> <p>Learn about most famous forts and palaces in India.</p>

11	T 205	Cultural Tourism in Andhra Pradesh	2017	<p>Understand culture and Cultural impacts of Andhra People</p> <p>Students understand culture and life style of Andhra.</p> <p>Learn about performing arts and cultural contribution of various dynasties</p>
12	T 301	Travel Agency and Tour Operations Management (TMP)	2017	<p>Gain knowledge of history of travel agency, nature, and form of travel.</p> <p>Build an understanding of functions performed by the Travel agency and tour operator.</p> <p>Comprehend the International rules and regulations of travel agencies</p>
13	T 302	Emerging Trends in Tourism (MP)	2017	<p>Students will learn about different types of Tourism.</p> <p>Build an Understanding of socio, cultural and economic impacts of tourism.</p> <p>To learn Tourism related laws, responsibilities and different acts related to tourism.</p>
14	T 303	Airline Ticketing and Information Management (MPJ)	2017	<p>Students know about IATA and its functions</p> <p>Gain knowledge and use of information technology in tourism industry</p> <p>To know about tour office management skills and tour desks</p>

15	T 304 a	Tourism Research Methods (GVKR)	2017	To make the student understand the scope of research in tourism sector. Students learn different techniques used in Research for tourism sector. Gain knowledge in presentation of research findings and prepare projects
16	T 304 b	Transport Management (ALC)	2017	Students will understand the role of Transport in Tourism Gain knowledge on the importance of manpower in Transport Business Comprehend the students how Transport Management is essential in Tourism
17	T 304 c	Communicative English for Tourism and Hospitality	2017	➤

18	T 304 d	Four Guide	2017	➤
19	T 305 a	Heritage Management	2017	➤
20	T 305 b	Tourism Economics (VRB)	2017	<p>Students learn the concepts of demand and supply in tourism.</p> <p>Assess the impact of tourism on environment, social and political.</p> <p>To evaluate the role of public and private sectors and sources of finances</p>
21	T 401	Tourism Marketing	2017	<p>Students acquire knowledge on the tourism needs and demands.</p> <p>To know different types of marketing strategies related to the tourism industry.</p> <p>Students acquire different types of skills pertaining to tourism sector</p>

22	T 402	Tourism and Hospitality Management	2017	<p>Student will be in a position to distinguish between different types of accommodations in the hotel industry.</p> <p>Will realize the importance of hospitality in the tourism sector.</p> <p>He or she will be familiar with various types of cuisines in the hotel</p>
23	T 403	Environment and Tourism	2017	<p>Learn about the wildlife Sanctuaries</p> <p>Gain knowledge on environment and management of Eco System</p> <p>Comprehend the Global climate policies</p>
24	T 404 a	Health and Medical Tourism	2017	<p>Develop understanding of medical tourism, its development over ages as an industry</p> <p>Learn the role of government and private sectors in promotion of Medical Tourism</p> <p>Identify various issues related to Medical Tourism and Emerging</p>
25	T 404 b	Dissertation + Viva	2017	➤

26	T 404 c	German Language	2017	➤
27	T 404 d	Hindi Language	2017	➤
28	T 405 a	Adventure Tourism	2017	<p>Explain the status and scope for adventure tourism in India. Learn different types of adventure tourism</p> <p>.Evaluate the role of government and other stakeholders in adventure tourism</p>

29	T 405 b	Event Management	2017	<p>1) Know the types and importance of event management.</p> <p>2) Understand the managerial and operational aspects pertaining to the MICE industry.</p> <p>3) Learn about customer care, marketing equipment and tools</p>
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4. Centre for Women's Studies

	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	SVUWS-105a	Gender, Environment, Climate Change & Livelihood	2017	<ul style="list-style-type: none"> ➤ This course builds theoretical base required for classification Gender Roles and livelihood of rural and tribal women. ➤ Impart skills and knowledge for developing Sustainable Environment and Livelihood Management systems with gender mainstreaming.
2	SVUWS-105b	Gender Society and Power Relations	2017	<ul style="list-style-type: none"> ➤ This course Insights on Gender Disparities within the Family, Economy, Education, Political and Legal Systems, understanding of social dynamics and power relations to perform the society and acquired gender sensitized skills.

3	SVUWS-106a	Human Values And Ethics –I	2017	➤ The course is to enable students to develop amoral values and ethics for holistic approach of human development.
4	SVUWS-106b	Leadership values	2017	➤ This course instill skill and domaine knowledge required for hands-on leadership learning experience focusing on leadership as an outgrowth of universal values that will help as effective and ethical leaders.
5	SVUWS-205a	Capacity building and leadership Training	2017	➤ Enhance Knowledge and skills among students in designing and organization of suitable capacity building programmes and
6	SVUWS-205b	Gender & Media	2017	➤ Students learn to Critical analysis of Gender representation and socio-cultural mechanism on media
7	SVUWS-206a	Human values & Professional Ethics –II	2017	➤ To develop values and professional ethics in an organization and society.
8	SVUWS-206b	Familial values and Ethics	2017	➤ To apply the skills of theory in practice with families and children to understand the family values and ethics
9	SVUWS 301	Gender, Science & Technology	2017	➤ Students acquire skills on Approaches to applying Gender in Science and Technology to create Gender Management System.

10	SVUWS 304d	Women's participation in Agriculture & Allied sectors	2017	<ul style="list-style-type: none"> ➤ To understand the Role of Women in Agriculture and allied fields and Policies and Programmes for Women in Agriculture importance's in our country and to know the possible oppournities to create agri-business.
11	SVUWS 305a	Gender Sensitization & Training	2017	<ul style="list-style-type: none"> ➤ To equip the students on the capacities to raise gender sensitivity to reduce felinity and masculinity and ➤ To important knowledge on the appropriate actions to be taken for sustenance of gender equal society
12	SVUWS 305b	Gender Identity and Leadership	2017	<ul style="list-style-type: none"> ➤ Provides knowledge about social process and cultural understanding. It also develops a clear and precise conceptual clarity on gender and leadership.
14	SVUWS 305c	Women and Governance	2017	<ul style="list-style-type: none"> ➤ To enable the students to understand the Women and Governance in the Indian context
15	SVUWS 404c	Multimedia systems	2017	<ul style="list-style-type: none"> ➤ Hands on experience on Multimedia: media and Data Streams. ➤ To understand Multimedia operating and Communication Systems.
16	SVUWS 404d	Reproductive Health and Family Life Education	2017	<ul style="list-style-type: none"> ➤ Create knowledge about Reproductive Health and Communicable Diseases ➤ Awareness on Reproductive Health Care Services, Policies & Programmes

17	SVUWS 405a	Women & Globalization	2017	<ul style="list-style-type: none"> ➤ To create awareness among the students on the ongoing process of globalization; ➤ To analyze the impact of globalization on feminization of labour force, low wages and Income gender inequalities
18	SVUWS 405b	Technical communication and computer ethics	2017	<ul style="list-style-type: none"> ➤ Establish skills on Technical Writing, Computer Ethics, Hacking and Hacker Ethics computer crimes in gender perspective.
19	SVUWS 405c	Gender & Mass Communication	2017	<ul style="list-style-type: none"> ➤ To provides a clear and precise clarity about gender status in contemporary society by referring the participation of women in mass communication

5.Econometrics

S.No	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/ Skill development
1	EMT 101	MicroeconomicTheoryI	2017	<ul style="list-style-type: none"> • The microeconomic theory is to analyze how individual decision-makers, both consumers and producers, behave in a variety of economic environments. • The common goal in all of these issues is to identify the incentives of the various participating agents and the trade-offs that they face. • Microeconomics is a branch of economics that studies the behavior of individuals and firms in making decisions regarding the allocation of scarce resources and the interactions among these individuals and firms. • Microeconomics shows conditions under which free markets lead to desirable allocations.

2	EMT 102	Macroeconomic Theory I	2017	<ul style="list-style-type: none"> • Define and explain the process of calculating national income, identify its components, demonstrate circular flow of income, analyse the various income identities with government and international trade, define the concept of green accounting. • Understand Say's law of market, classical theory of employment and Keynes objection to the classical theory, demonstrate the principle of effective demand and income determination. • Explain the meaning of consumption function, relationship between APC and MPC, consumption and income, concept of multiplier and analyse the theories of absolute and relative income hypotheses. • Understand the relationship between investment and savings, demonstrate investment multiplier, and understand the meaning of MEC and MEI. CO5. Illustrate
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3	EMT 103	MathematicalMethods	2017	<ul style="list-style-type: none"> • Formulate mathematical models describing the dynamics of economic systems. Demonstrate the role of quantitative techniques in the field of business/industry, illustrate different types of equations, solve equations and system of equations, understand the concept of sets, illustrate and apply basic set operations. • Explain the rules for calculating derivatives, uses and application in calculating inter-relationship among total, marginal and average cost and revenue, calculate maxima, minima, elasticity, decide the optimal level of production for a firm. • Demonstrate the rules for calculating integration, describe the importance and application of integration in consumers' and producers' surpluses, total revenue and cost.
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4	EMT 104	Practical I	2017	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 Able to find Inverse of a Matrix, System of Simultaneous Linear Equations and Cramer's Rule method.</p>
5	EMT 105	StatisticalMethods	2017	<p>CO1 Able to find Mean, Median, Mode, Range, Quartile Deviation and Standard Deviation and Coefficient of Variation.</p> <p>CO2 Able to apply Binomial, Poisson, Normal and Log-Normal Distribution Correlation and Regression Analysis.</p> <p>CO3 Able to test small sample tests based on t, F and Chi-square distributions</p> <p>CO4 formulate Statistical Methods describing the dynamics of economic systems such as production function analysis and solve econometric analysis of underlying data use with knowledge</p>
6	EMT 106	HumanValuesandProfessiona lEthics-I	2017	
7	EMT 201	MicroeconomicTheoryII	2017	Course Objectives: The microeconomic theory is to analyze how individual decision-makers, both consumers and producers,

8	EMT 202	MacroeconomicTheoryII	2017	<p>CO1 The overarching goals of macroeconomics are to maximize the standard of living and achieve stable economic growth</p> <p>CO2 The goals are supported by objectives such as minimizing unemployment, increasing productivity, controlling inflation, and more.</p> <p>CO3 The macro economy of a country is affected by many forces, and as such, economic indicators are invaluable to assessing different aspects of performance.</p> <p>CO4 Meaning and Types of Inflation – Demand-Pull inflation – Cost-Push Inflation – The Phillips curve – The Inflation –</p>
9	EMT 203	BasicEconometrics	2017	<p>CO1 Adequate competency in the frontier areas of economic theory and methods.</p> <p>CO2 Formulation and estimation of a multiple regression model.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all models</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Estimation of system of equations estimation of panel</p>

10	EMT 204	Practical II	2017	<p>CO1 Students can Identify Inter industrial relationships using Input-output analysis,</p> <p>CO2 analyse maximization of profits and minimization of costs can evaluate using Linear Programming,</p> <p>CO3 Analyse relationship of economic variables using simple and multiple regression models which are covered in basic Econometrics</p> <p>CO4 Able to estimate and interpret linear regression models and be able to distinguish between economic and statistical</p>
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11	EMT 205	Mathematical Economics	2017	<p>CO1 Students can deal Mathematical calculation of static optimization, Application of Lagrange's method and also student can evaluate Differential Equations and with Economic Applications.</p> <p>CO2 Able to estimate and interpret Inter industrial relationships using Input-output analysis, also analyse maximization of profits and minimization of costs of the firms using Linear Programming method</p> <p>CO3 Economic Applications of Differential Equations – Dynamic Multiplier – Harrod-Domar Model.</p> <p>CO4 Homogeneous Linear Difference Equations with Constant Coefficients – Particular Solution of Non-homogeneous Linear Equations – Linear First Order and Second Order Difference Equations with constant coefficients – Cobweb Model –Market</p>
12	EMT 206	Human Values and Professional Ethics II	2017	

13	EMT 301	<i>Indian Economy</i>	2017	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources. Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will be aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, make in India etc</p>
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14	EMT 302	<i>EconomicsofInsurance</i>	2017	<p>CourseOutcomes:Attheendofthecourse, thestudentwillbeableto</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development</p>
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15	EMT 303	<i>Advanced Econometrics</i>	2017	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Concepts of Heteroscedasticity & Multicollinearity. Possible reasons behind the presence of Heteroscedasticity & Multicollinearity. Skill to judge the reliability of estimation in case of violation of basic assumptions for the application of ordinary linear regression method.</p> <p>CO2 Concepts of Autocorrelation reasons behind the presence of Heteroscedasticity & Multicollinearity. Describe the variance/covariance matrix for the regression errors under the assumption that the errors are correlated</p> <p>CO3 Apply modern econometric methods covering time series analysis, financial econometrics, microeconometrics,</p>
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16	EMT 304	<i>Computer Applications and Data Analysis</i>	2017	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Students will get basic knowledge of computers i.e., block diagram, evolution of computer, input/output devices, storing information in computer etc.</p> <p>CO2 At the end of this course student will gain Examine spreadsheet concepts and explore the Microsoft Office Excel environment. Import and export data.</p> <p>CO3 Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas. Perform analysis tasks using Data analysis pack</p> <p>CO4 Student gained and evaluate Econometric Methods such</p>
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17	EMT 305	<i>PublicFinance</i>	2017	<p>.</p> <p>CourseOutcomes:Attheendofthecourse, thestudentwillbeableto</p> <p>CO1 Understand the sources of finance both public and private, demonstrate the role of government to correct market failures and possible advantage of public financing</p> <p>CO2 Attain the advantages and knowledge of public investments and other government expenditures. Understand the causes of growing public expenditures for various programmes and policies within and outside the country.</p> <p>CO3 Understand the possible burden, benefits and distribution of various types of taxes among various classes of people, know the general trend and impact on general welfare and arouse them to suggest good and bad tax system.</p> <p>CO4 Understand the needs of public borrowing from all possible sources to meet necessary public</p>
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18	EMT 306	<i>Financial Institutions and Markets</i>	2017	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Explain the broad features of Indian financial institutions with its apex banks' objectives and purview. Also understand the instruments to control credit in the country.</p> <p>CO2 Effectively narrate the kinds and components of money with its regulatory system, be aware of the functions, objectives and limitations of commercial banks.</p> <p>CO3 Identify the existence and development of non-banking financial institutions, know the important role of Mutual funds, LIC, investment companies etc., utilize and effectively participate in the development process.</p> <p>CO4 Understand the conditions of financial markets and its</p>
19	EMT 307	<i>Practical III</i>	2017	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Student will gain Examine spreadsheet. Work with pivot tables and charts. Create and edit charts. Learn to use functions and formulas.</p> <p>CO2 Perform analysis tasks using Data analysis pack using MS-Excel.</p> <p>CO3 Student gained and evaluate Econometric Methods such as OLS, LPM, Logistic regression analyse and conclude using SPSS Package</p> <p>CO4 Student will able to test of Multicollinearity.</p>

20	EMT 308	IntroductiontoEconometrics	2017	<p>CO1 students will have adequate competency in the frontier areas of economic theory and methods</p> <p>CO2 Use basic econometric estimation techniques such as Ordinary Least Squares to estimate bivariate and multivariate regression models.</p> <p>CO3 Decision about the statistical significance of individual explanatory variable and also over all model.</p> <p>CO4 Impacts for the violation of one of the important assumptions for application of OLS regression.</p> <p>CO5 Students will acquire additional specialization topics are</p>
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21	EMT 309	IndianEconomy	2017	<p>CourseOutcomes:Attheendofthecourse, thestudentwillbeableto</p> <p>CO1 Students will develop ideas of the basic characteristics of Indian economy, its potential on natural resources.Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.</p> <p>CO2 Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole. Students will obtain information regarding various agricultural issues in India and remedies for it</p> <p>CO3 Students will aware about recent economic affairs such as demonetization, universal basic income, cashless economy, skill and training development schemes, make in India etc.</p>
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22	EMT 310	EconomicsofInsurance	2017	<p>CourseOutcomes:Attheendofthecourse, thestudentwillbeableto</p> <p>CO1 Demonstrate knowledge of insurance contracts and provisions, and the features of property-liability insurance, life and health insurance, and employee benefit plans.</p> <p>CO2 Demonstrate knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.</p> <p>CO3 Develop skills to facilitate insurance product cost and pricing, marketing, and distribution.</p> <p>CO4 Develop practical skills through professional development</p>
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23	EMT 401	<i>International Trade and Finance</i>	2017	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Identify the basic difference between inter-regional and international trade, understand how international trade has helped countries to acquire goods at cheaper cost and explain it through the various international trade theories.</p> <p>CO2 Show the benefits of international trade in a way how nations with strong international trade have become prosperous and have the power to control world economy and how global trade can be one of the major contributors of reducing poverty.</p> <p>CO3 Explain how restrictions to international trade would limit a nation in the services and goods produced within its territories and at the same time explain that a rise in international trade is essential for the growth of globalization.</p> <p>CO4 Show the importance of maintaining equilibrium in the</p>
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24	EMT 402	<i>Environmental Economics</i>	2017	<p>Course Outcomes: At the end of the course, the student will be able to</p> <p>CO1 Realize the importance and influence of environment on the economy including the quality of manpower. Arouse their feelings to make cleaner environment so as to achieve harmonious development.</p> <p>CO2 Understand that environmental problem is not the problem of a single country or region but a global problem/issue. Hence, policy formulation may be for all countries.</p> <p>CO3 Demonstrate the scientific management of waste materials; realize the role and importance of individuals to keep the environment clean.</p> <p>CO4 Understand the causes and victims of environmental pollution like poverty, population explosion, and over-use of</p>
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6.Economics

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcome
1	ECO-101 & 201	Micro Economics Analysis – I & II	2017	<ol style="list-style-type: none"> 1. Graduate Consulting Analyst. Graduate Recruitment Bureau. 2. Economic Consultant (Public Policy). 3. NERA Internship -Industry Research Analyst. Research Fellow. 4. Graduate Economic Consulting Internship, Economist, Customer Experience Strategy.
2	ECO-102 & 202	Macro Economics Analysis – I & II	2017	<ol style="list-style-type: none"> 1. Work for a central bank of financial institutions. 2. Work as a consultants. 3. work in banking sector.
3	ECO-103&203	Public economics &Federal Finance	2017	<ol style="list-style-type: none"> 1. Assistant commercial Tax Officers. 2. Industrial finance officers. 3. Bill collectors.
4	ECO-104&204	Mathematical Methods in Economics – 1and Statistical Methods in Economics	2017	<ol style="list-style-type: none"> 1. Assistant Statistical officers. 2. Bossiness firm consultant. 3. Market research Analyst. 4. Financial analyst. 5. Investment manager.

				6. International trade specialist.
5	ECO 105(a)	Fundamentals of Computer	2017	1. Digital Assistants. 2. Office Computer operators.
6.	ECO 105(b)	Urban Economics	2017	1. Senior urban economist. 2. International urban Economist. 3. Senior program Research analyst. 4. Urban environmental impact officer.
7.	ECO 105(c)	Welfare Economics	2017	1. Policy maker. 2. Administrator. 3. Welfare officer in Sachivalyam. 4. Admin in Sachivalayam.
8.	ECO 106(a)	Economics of Environment	2017	1. Environmental pollution officer. 2. Environmental consultants. 3. Environmental pollution planning and consultants. 4. Environmental conservation / Advocacy.
9.	ECO 106(b)	Demography	2017	1. National Sample Survey officers. 2. Census Survey Officers. 3. Chief planning officers.
10.	ECO 107	Human Values and Professional Ethics -I	2017	1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 2. Introduction of several Nature of values to be performed

				<p>by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
11	ECO 205(a)	International Trade: Theory and Policy	2017	<ol style="list-style-type: none"> 1. International trading officers. 2. Export and import Officers. 3. Shares consultants. 4. Commercial desk manager. 5. Global trade Advisory.
12	ECO 207	Human Values and Professional Ethics -II	2017	<ol style="list-style-type: none"> 1. Student will know the values of ethics in various fields including medical, social and business ethics. 2. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 3. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
17	ECO 301	Economics of Growth and Development	2017	<ol style="list-style-type: none"> 1. Project Coordinator. 2. Recreation manager. 3. Programme Director. 4. Social and community manager.

18	ECO 302	Indian Economy	2017	<ol style="list-style-type: none"> 1. NSSO. 2. Economic Survey directors.
19	ECO 304 (a)	International Finance	2017	<ol style="list-style-type: none"> 1. Financial Advisors. 2. Financial officers.
23	ECO 304	Communication and Soft Skills	2017	<ol style="list-style-type: none"> 1. Skill development coordinators. 2. Public relation officers. 3. Marketing and Advertising. 4. Media. 5. Meeting and event planning.
26	ECO 401	Rural Development	2017	<ol style="list-style-type: none"> 1. MGNREGA Programme officers. 2. District Coordinators. 3. Institutional building officers.
27	ECO 402	Financial Institutions and Markets	2017	<ol style="list-style-type: none"> 1. Corporate finance. 2. Financial planning officers.
28	ECO 403 (a)	India's Economic Reforms	2017	<ol style="list-style-type: none"> 1. Planning & Development Officers
29	ECO 404 (c)	Entrepreneurship and Skill Development	2017	<ol style="list-style-type: none"> 1. Business consultant. 2. Research and development. 3. Recruiter. 4. Sales managers.
30	ECO 404 (d)	Labour Economics	2017	<ol style="list-style-type: none"> 1. Labour officers. 2. Labour relations officers. 3. Labour relations assistant.

				4. Construction estimators
31	ECO 305 (c)	Economics of Insurance	2017	<ol style="list-style-type: none"> 1. Insurance Agents. 2. Loan processor. 3. Loss control officers. 4. Risk managers.
33	ECO 405 (a)	Human Resource Development	2017	<ol style="list-style-type: none"> 1. Human resource recruiter. 2. Performance management and development. 3. Employees training officers. 4. Organizational development officers.

7. English

S.No	Course Code	Name of the Course	Year of introduction	Course outcomes
1)	101:	Poetry-I	2017	<ul style="list-style-type: none"> • An understanding of the evolution of English poetry across ages. • May inspire poetic creativity

2)	102:	Drama-I	2017	1. Perceive the nuances of performance 2. Recognize the transformation of human experiences into dramatic experiences.
3)		:Fiction-I	2017	1. Aesthetic and literary merits of the novel 2. The conditions of the age and the influence
4)	104	:Prose-I	2017	1. Understand the genre of essay 2. Imbibe the deeper human values implied in the essay.
5)	106:	Human Values and Professional Ethics-I	2017	1. Realize the necessity of practicing Human values and Ethics in all walks of life including the profession they opt for 2. Understand Bhagvad Gita as a guide for modern lifestyle
6)	201	:Poetry-II	2017	Sensitizes the students on the classical and contemporary poetic ethos Raises student awareness on movements like Modernism, War Poetry, Women's poetry, Symbolism etc,
7)	202	:Drama-II	2017	

8)	203	:Fiction-II	2017	<ol style="list-style-type: none"> 1. The great works of major novelist of modern age 2. The ability to understand the technique of the Novel
9)	204	:Prose-II	2017	<p>After the completion of the course the students are able to</p> <ol style="list-style-type: none"> 1. Know the working mechanism of Feminism and socialism 2. Know the mind and strategies of Victorian essayists 3. Know the importance of culture in the lives of Victorian people <p>Know the importance of being human in their dealings with the fellow beings</p>
10)	205:	English Language Teaching	2017	<ol style="list-style-type: none"> 1. Understand the importance of language lab, teaching material and audio-visual aids in the learning and teaching of English. 2. Know to test and testing components of language tests examinations and evaluation procedures

11)	301	: Indian English Literature-I	2017	<ol style="list-style-type: none"> 1. Understand the Indian English writings and movements associated with it in India 2. Understand the merits of Indian English writings and drawbacks if an
12)	302:	American Literature-I	2017	<ol style="list-style-type: none"> 1. An idea of English literature in America 2. Familiarity with the literary movements 3. Knowledge about concepts like Puritanism, transcendentalism, symbolism, impressionism etc
13)	303:	Literary Criticism-I	2017	<p>Equips the student with the evolution of English Literary Criticism from Aristotle to early twentieth century</p> <p>Helps students map the genealogy of Western canonical critical texts</p>
14)	304 (A) 304(B): 304 (C): 305 (D):	:Comparative Literature Short Story Women's Writings Indian Literature in English	2017	<ol style="list-style-type: none"> 1. Understand national and world literatures and the need of comparative studies in the global world. 2. Understand the ways of comparative analysis <p>: Perceives creativity as a tool of empowerment and unity amongst women. Understand gendered spaces in creativity and the genealogy of</p>

15)	305 (A):	Communicative English	2017	.Understand the significance and importance of Communication in English in the present day world 1. Understand communication process, the different types and barriers of communication
16)	305(B):	English for Media	2017	1. Understand the use of language in different situations in writing for the media 2. Learn the oral skills necessary for media like interview skills
17)	305(C):	3An Introductory Course to Literature	2017	3. Understand the use of language in different situations in writing for the media 4. Learn the oral skills necessary for media like interview skills
18)	401:	Indian English Literature-II	2017	1. Understand the Indian English writings and movements associated with it in India 2. Understand the poetic features of Indian English poetry

19)	404(A): 404(B): 404(C): 404(D):	Translation: Theory and Practice Subaltern Studies Post-Colonial Literatures World Classics in English Translations	2017	1. Know the concepts of dalitism, feminism, marginalism and Subaltern aspects with relevant theories 2. Appreciate and understand the struggles and sorrows of subalterns
20)	405(A): 405(B): 405(C):	Soft Skills Indian Literature in English Translation Contemporary Translation	2017	1. Will learn about morals and responsibilities 2. Learn to acquire the enduring values embedded in the great literary works of our writers

8. Linguistics

S.No	Course Code	Name of the course	Year of introduction	Course outcomes
1	LING 101	Language and Linguistics	2017	Understand basic concepts of language. 2. Analyze structure of language and grammatical analysis.

				s3. Understand Linguistics and other fields.
2	LING 102	Phonetics	2017	<ul style="list-style-type: none"> 1. Understand the process of Communication and speech production, Classification and description of speech sounds. 2. Analyze production of speech, Secondary and double Articulations and suprasegmental features 3. Understand principles and types of Transcription
3	LING 103	Phonology	2017	<ul style="list-style-type: none"> 1. Understand concept of Phoneme, Principals of Phonemic analysis and discovery procedures. 2. Analyze phonemes, Phonological systems, procedures of phonemics and basic units of Phonology. 3. Understand Generative Phonology
4	LING 104	Morphology	2017	<ul style="list-style-type: none"> 1. Analyze Morpheme, classification and types of morphemes and grammatical categories 2. Analyze derivation, inflection, different models of grammatical description and morpho phonemics 3. Express Intermediate constituents, types of constructions and Idioms

5	LING 105	Syntax	2017	<p>Understand assumptions about language, components of grammar and sentence constituents</p> <ol style="list-style-type: none"> 2. Analyze Phase structure rules, X-bar Notation and grammatical transformations 3. Understand categorical, sub-categorical information, selectional restrictions and syntactic structures of Indian Languages
6	LING 106	Human Values and Professional Ethics-I	2017	<p>Understand Nature of Ethics, Professional Ethics, Nature of Values and influence on Individual and Society</p> <ol style="list-style-type: none"> 2. Understand Bhagavad Gita, four noble duties and values of various religions 3. Understand crime and Theories of Punishment
7	LING 201	Semantics	2017	<ol style="list-style-type: none"> 1. Understand Nature and Scope of Semantics and types of meaning 2. Analyze lexical structure, sentence structure and meaning 3. Understand Lexical context of Meaning and Change of Meaning
8	LING 202	Historical Linguistics	2017	<p>Understand the major breakthroughs in historical Linguistics</p> <ol style="list-style-type: none"> 2. Understand sound, Linguistic change, Linguistic borrowing, internal reconstruction, glottochronology and practices of comparative method. 3. Solve problems and analysis in Historical Linguistics

9	LING 203	Dialectology	2017	<ul style="list-style-type: none"> 1. Understand nature and Scope of Dialectology, purpose of Dialectology and Dialectal studies 2. Analyze types of dialects and variability 3. Understand dialect survey methodology and its approaches
10	Coruse:204	Field Linguistics	2017	<ul style="list-style-type: none"> 1. Understand scope and purpose of field linguistics and problems of investigating non literary language Analyze the techniques and methods of data elicitation and collection of Linguistic data 3. Understand data processing and language documentation
11	LING 205	Language Families of India and Comparative Dravidian (Phonology)	2017	<ul style="list-style-type: none"> 1. Understand language families of India, Dravidian Language Family and history and sources of each Dravidian Language. 2. Analyze vocalic, consonant and Sandhi systems, and reconstruction of Dravidian. 3. Understand sub grouping and relation with other language families
12	LING 206	Human Values and Professional Ethics – II	2017	<ul style="list-style-type: none"> 1. Understand value education and human values 2. Understand the effectiveness and capability of Medical and Business Ethics 3. Understand environmental and social ethics
13	LING 301	Sociolinguistics	2017	Analyze language and society, Linguistic variability and language

				<p>varieties</p> <ol style="list-style-type: none"> 2. Analyze Sociology of language planning and Language and Social identity 3. Understand Sociolinguistic Methodology and language and power
14	LING 302	Language Contact	2017	<p>Analyze speech as social interaction and language contact and Interference</p> <ol style="list-style-type: none"> 2. Analyze Indian language contact situation and effects of language contact 3. Understand Language contact and change and linguistic borrowing
15	LING 303	Communication Disorders and Speech Pathology	2017	<p>Understand disordered communication, language and the brain</p> <ol style="list-style-type: none"> 2. Understand articulation, language and hearing disorders and most communication disorders 3. <u>U</u>nderstand speech pathology
16	LING 304A	Psycholinguistics	2017	<ol style="list-style-type: none"> 1. Understand Introduction and an overview of Psycholinguistics and Acquisition of language 2. Analyze speech production, perception, and comprehension. 3. Understand lexical processing
17	LING	Communication	2017	<ol style="list-style-type: none"> 1. Analyze communication theory and Linguistic communication

	304B	Technology		<ol style="list-style-type: none"> 2. Understand Artificial Intelligence, Machine Translation and Micro planner artificial languages 3. Understand mobiles changes the society
18	LING 305B	Bilingualism	2017	<ol style="list-style-type: none"> . Understand speech as social interaction, theory of bilingualism and LWC. 2. Analyze types of bilingualism and measurement of bilingualism. 3. Understand Indian bilingualism
19	LING 401	Language Acquisition and Child Language Development	2017	<p>Analyze language acquisition device and stages of language acquisition</p> <ol style="list-style-type: none"> 2. Understand continuity and discontinuity approaches and acquisition power 3. Analyze research view of language acquisition
20	LING 402	Natural Language Processing	2017	<p>Understand nature and scope and importance of NLP</p> <ol style="list-style-type: none"> 2. Analyze Mathematical Foundations, essential information theory and Entropy 3. Analyze Tagging, Taggers, probabilistic parsing and clustering
21	LING 403	Language Universals and Linguistic Typology	2017	<ol style="list-style-type: none"> . Analyze language universals and its role of universals in linguistic theory. 2. Uunderstand nature and scope of linguistic typology and linguistic typology as a principles of classification.

				3. Analyze language families of South Asia, South Asia as a Linguistic area and selected areal features of South Indian languages
22	LING 404A	Lexicography	2017	Understand lexicology and lexicography , notation and format, planning and organization 2. Analyze types, number and size of dictionaries and dictionary making 3. Understand bilingual dictionaries and practice .
23			2017	
23	LING 404B	Language Teaching	2017	Understand nature and scope of language and role language in language teaching. 2. Analyze language acquisition and second language learning and cognitive models of language. learning/teaching 3. Understand teaching aids, remedial teaching material and computer aided language teaching
25	LING 405A	Branches of Linguistics	2017	Understand nature and scope of linguistic, language and linguistics and phonetics . 2. Understand Phonology, Morphology, Syntax, and semantics. 3. Understand types of Interdisciplinary Linguistics and Branches of Applied Linguistics

9. History

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	HST 101	History of India Up to 650 A D	2017	<ul style="list-style-type: none"> ➤ Students will have a familiarity with the sources, different political, social, economic, cultural and religious traditions of the Indian subcontinent upto 650 C.E. ➤ Student will also be well versed with different analytical approaches and models of interpretation
2	HST 102	History of Indian Polity and Economy, 1206-1757	2017	<ul style="list-style-type: none"> ➤ Students can familiarize in understanding the continuity with changes in all spheres of history, polity and economy under the Delhi sultanates. ➤ Students can understand thoroughly the Mughal conquest of India, their rule, polity and legacy.
3	HST 103	History of Modern India, 1757 – 1947	2017	<ul style="list-style-type: none"> ➤ Student can gain knowledge on the English East India company rule and their reforms.

4	HST 104	History of Modern World, 1900-1945	2017	<ul style="list-style-type: none"> ➤ Student can gain the knowledge on the history and consequences of the World between two World Wars pertaining to League of Nations, Great Depression, Nazism, and Fascism. ➤ Students will understand International Relations during 1919-39. ➤ Students can understand thoroughly about the Second World War and its impact.
5	HST 105 (A)	History of Andhrasupto 1336 A D	2017	<ul style="list-style-type: none"> ➤ The study of comprehensive history of the country is incomplete without the study of regional history. ➤ Regional history is becoming more and more popular, for it has inherit potential of tapping varied kinds of sources for understanding the divergent aspects of local heritage and culture. ➤ The students can develop thorough understanding on Ancient Andhra history and culture.
6.	HST 105 (B)	History of World Civilizations	2017	<ul style="list-style-type: none"> ➤ Students gain familiarity with the rise and characteristic features of the ancient world

				<p>Civilizations, its regional extent and variation.</p> <ul style="list-style-type: none"> ➤ Students can understand the glory of the civilizations, the nature of its cities and material remains and institutions.
	HST 106 (A)	Theoretical Concepts of Tourism	2017	<ul style="list-style-type: none"> ➤ Students gain familiarity with the rise and characteristic features of the ancient world Civilizations, its regional extent and variation. ➤ Students can understand the glory of the civilizations, the nature of its cities and material remains and institutions.
7.	HST 106 (B)	History of Medieval World	2017	<ul style="list-style-type: none"> ➤ Student can gain thorough knowledge on the world in medieval ages and rise of Christianity ➤ Will understand Transition to Modern Age ➤ Possess knowledge on French Revolution and its Impact
8.	HST 107	Human Values and Professional Ethics-I.	2017	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human

				<p>behavior and actions in our daily lives.</p> <ul style="list-style-type: none"> ➤ They inspire the fundamental goodness of human beings and society at large
9.	HST 201	History of India 650-1206 A D	2017	<ul style="list-style-type: none"> ➤ Students can develop comprehensive knowledge on political, social, economic, religious and cultural history of early medieval India , regional polities and its impact ➤ Can also able to understand the circumstances lead to the invasions of Arabs and foundation of Muslim rule in India
10	HST 202	Social and Cultural History of India, 1206-1757	2017	<ul style="list-style-type: none"> ➤ Students can gain comprehensive knowledge on the freedom movement from its inception upto independence in India ➤ The students can also able to understand the role of national congress and prominent leaders of national movement, problems and perspective in the progress of freedom movement
11	HST 203	Freedom Movement in India, 1857 –1947	2017	<ul style="list-style-type: none"> ➤ The students can understand the Cold War and its Impact

				<ul style="list-style-type: none"> ➤ Possess knowledge on UN and the Concept of World Peace ➤ Gain the knowledge on the Disintegration of Socialist Block
12	HST 204	History of Contemporary World, 1945-2000	2017	<ul style="list-style-type: none"> ➤ This course provides comprehensive knowledge on the last imperial political formation in South India and the history of Vijayanagara, Bahmani and contemporary pretty powers. ➤ It helps to understand with the context of polity, economy, culture, religious and ideological changes
13	HST 205	A) History of Vijayanagara Empire B) History of Modern Africa	2017	<ul style="list-style-type: none"> ➤ Students will be familiar with Road to Independence in Africa ➤ They will understand development and underdevelopment in Africa
14	HST 206	A) Historical Application of Tourism in India B) Women Studies in Modern India	2017	<ul style="list-style-type: none"> ➤ The students can familiarize the knowledge needed to excel in tourism activities. ➤ It will equip the students with the solid foundation to build upon the fundamentals, useful skills and expertise that can assist employment in Tourism Industry.

15	HST 207	Human Values and Professional Ethics-II	2017	<ul style="list-style-type: none"> ➤ The student can understand thoroughly the importance of Women Studies ➤ Will understand the role of Women in Hinduism and Islam ➤ Also gain knowledge about the Women participation in various movements in India
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10. Human Rights and Social Development

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1.	HR 101	Human Rights: Concepts and Theoretical Perspectives	2017	<ol style="list-style-type: none"> 1. To Expose the students about nature and concept of Human Rights. 2. To apprise the students about the Liberal. Marxian prerspectives. 3. To expose the students that alternative, third world and Indian Perspectives of Human Rights,
2.	HR 102	Human Rights in India the constitutional and Legal Framework	2017	<ol style="list-style-type: none"> 1. Students to know the Indian Constitution and Human Rights. 2. To understand the Judiciary and Human Rights. 3. To understand about Criminal Justice system in India.

3.	HR 103	Human Rights and Duties Education	2017	<ol style="list-style-type: none"> 1. To expose students about the importance of Human Rights and Duties education. 2. To apprise the students about the target groups for Human Rights 3. To expose the students about the content of Human Rights Education.
4.	HR 104	Rights and the implementation Machinery	2017	<ol style="list-style-type: none"> 1. To expose the students about the implementation machineries at National Level and International Level. 2. The students understand about how the problems in Accessing Justice through Courts and Tribunals. 3. To expose the students that statutory bodies of Human Rights.
5.	HR 105 A	Working Class and Human Rights and Duties	2017	<ol style="list-style-type: none"> 1. To understand the students about the status of working class, concept and issues. 2. To expose the student about the basic rights and duties of various sections. 3. To understand the Indian Constitutional Framework.

6.	HR 105 B	Human Rights Education, Teaching and Training	2017	<ol style="list-style-type: none"> 1. To expose the student about the origin, UNO and Human Rights education policies. 2. To apprise the students about the principles and practice in teaching of Human Rights Education. 3. To understand the student about training aspects of Human Rights.
7.	HR 106 A	Human Rights Activism and Role of NGOs	2017	<ol style="list-style-type: none"> 1. To expose the students about the different types of Human Rights Activisms. 2. To identify the student that the different Types of NGO's and their role for promoting the Human Rights.
8.	HR 106 B	Social Movements and Human Rights in India	2017	<ol style="list-style-type: none"> 1. To expose the students about the role of NGOs for protecting human rights. 2. To Understand the student about the Political Movements, Ecological and Environmental Movements of Human Rights. 3. To apprise the student about the various types of Social and Political Reforms of Human Rights.
9.	HR 107	Human Values and Professional Ethics - I	2017	<ol style="list-style-type: none"> 1. To expose the student about the concept and nature of human values.

				<ol style="list-style-type: none"> 2. To understand the student about nature of Values, Ahimsa and various religion theories. 3. To assess the student about various Crime and Theories of punishments
10.	HR 201	Human Rights and Indian Polity	2017	<ol style="list-style-type: none"> 1. To expose the students about the concept of basic structure of Indian Polity, administrative structure in India. 2. To apprise the student about the role of People's Agencies for protecting and promotion of human rights in India. 3. To understand the students about the Legislative Procedure and implementation process in India.
11.	HR 202	Emerging Dimensions of Human Rights	2017	<ol style="list-style-type: none"> 1. To expose the students about the Human Rights and Duties of Non-State Armed Groups and Commercial Corporations. 2. To understand the students about the rights of future generation. 3. To apprise the students about the Human Rights and Changing Dimension of State Sovereignty and Humanitarian' Intervention.

12.	HR 203	Human Rights: The International Context	2017	<ol style="list-style-type: none"> 1. To understand the students about the evolution of human rights and UN charter of human rights. 2. To expose the students about regional dimensions of human rights and special conventions on human rights. 3. To understand the students about International conventions on human rights and duties.
13.	HR 204	Research Methodology, Statics and Computer Applications	2017	<ol style="list-style-type: none"> 1) Student to Know Scope of Social Research. 2) To Understand Data Analysis. 3) Understand About Types of Data Collections
14.	HR 205 A	Human Rights – The Socio Economic Context	2017	<ol style="list-style-type: none"> 1. To expose the students about the socio, economic background of human rights. 2. To apprise the students about human rights of vulnerable groups. 3. To understand the students about the basic human need for development with respect to human rights.
15.	HR 205 B	Societal Problems of Human Rights in India	2017	<ol style="list-style-type: none"> 1. To understand the student about the societal problems of human rights. 2. To understand the students about the social problems of minorities, scheduled caste and

				<p>scheduled tribes.</p> <p>3. To expose the students about Regionalism, terrorism.</p>
16.	HR 206 A	Human Rights and Criminal Justice System	2017	<p>1. To expose the students about Rights of Inmates of Prisons and Custodial Homes.</p> <p>2. To understand the students about the Right to Legal Aid, Access to Justice and Speedy Justice.</p> <p>3. To expose the students that the problems of human rights.</p>
17.	HR 207	Human Values and Professional Ethics - II	2017	<p>1. To expose the student about the concept and nature of human values.</p> <p>2. To understand the student about nature of Values, Ahimsa and various religion theories.</p> <p>3. To assess the student about various Crime and Theories of punishments.</p>
18.	HR 301	Social Movements and Human Rights and Duties	2017	<p>1. To expose the student about conceptual perspectives of social movements and human rights.</p> <p>2. To apprise the students about the social, political</p>

				<p>and religious reforms movements and human rights.</p> <p>3. To expose the students that the role of International and National Institutions in promoting Human Rights.</p>
19.	HR 302	Science, Technology, Human Rights and Duties	2017	<p>1. Understand the basic concept in science and technology and also about Indian perspective on science and technology.</p> <p>2. Ability to know about the Right to Adequate Food, Agricultural, Biotechnology Impact of on Agriculture, Food Biotechnology and Revolution in Information Technology.</p> <p>3. Analyse know rights to health and application of Biotechnology in Medicine and also about Intellectual Property Rights.</p> <p>4. Assess the use of natural resource Environmental Biotechnology and Use Technologies</p>
20.	HR 303 A	Human Rights and Duties – Advocacy and Extension work and Viva-Voce	2017	<p>1. To understand the students that the issues for peoples movements and public advocacy on human rights and duties</p> <p>2. To understand the students on extension work with</p>

				<p>respect to human rights.</p> <p>3. To understand the students about the uses of NGOs fact finding and uses of information media.</p>
21.	HR 303 B	Socially/Economically Disadvantaged people and Human Rights and Duties	2017	<p>1. To expose the students about the concept of the Constitutional Safeguards and Special Protection Laws and Policies.</p> <p>2. To understand the students about the concept of the disadvantaged people in the Indian Society.</p> <p>3. To understand the students about the Institutional Mechanisms for protecting the human rights of the disadvantaged groups.</p>
22.	HR 303 C	Human Duties and Responsibilities	2017	<p>1. To understand the student about the concept of human duties and responsibilities.</p> <p>2. To expose the student about human values and values of humanism.</p> <p>3. To apprise the students about evaluation of human duties.</p>
23.	HR 303 D	Children and Human Rights and Duties	2017	<p>1. To understand the student about the concepts of</p>

				<p>Child Labour and protecting norms at National and International level.</p> <ol style="list-style-type: none"> 2. To apprise the student that the status of children in Indian society with respect to human rights. 3. To understand the students about the National and International mechanisms for protecting the child rights.
24.	HR 304	Soft Skills	2017	<ol style="list-style-type: none"> 1. To understand the student that the concepts of soft skills with respect to human rights. 2. To understand the student in employability skills in human rights aspects. 3. To expose the students that the professional skills for team building and problem solving.
25.	HR 305 A	Historical and Philosophical Perspectives of Human Rights	2017	<ol style="list-style-type: none"> 1. To expose the student that the a basic understanding to the concepts of human rights, human values, dignity, justice and equality. 2. To understand the students that the theories of human rights in various inter disciplinary dimensions. 3. To apprise the student that the concept of Magna Carta-Bill of Right-French and

				American- Declaration and Uncharted on human rights.
26.	HR 305 B	Human Rights and Duties in India	2017	<ol style="list-style-type: none"> 1. To understand the students about the concepts of Constitutional Human Rights and Responsibilities. 2. To apprise the students that Extra-ordinary situations and human rights in India. 3. To understand the violations of rights in present Civil Society in India.
27.	HR 401	Human Rights in Andhra Pradesh	2017	<ol style="list-style-type: none"> 1. To expose the students about various Human Rights Movements at National and State (Andhra Pradesh) Level. 2. To understand the concept of social stratification and problems of Caste and Un-touchability. 3. To expose the students that the gender inequality and various gender violation in Andhra Pradesh.
28.	HR 402	Development, Trade and Human Rights	2017	<ol style="list-style-type: none"> 1. To understand the student about the concept of human rights of various vulnerable groups at National and International level. 2. To apprise the student about the Trade related human rights violations and Trade development.

				3. To understand the student about the role of human rights in development.
29.	HR 403 A	International, Humanitarian and Refugee Laws	2017	<ol style="list-style-type: none"> 1. To expose the students about the concepts of International Humanitarian Law and Implementation enforcements of IHL. 2. To apprise the student about the concept of International Refugee Law and protection under International Law. 3. To understand the students about solution to Refugee Problem.
30.	HR 403 B	Environment and Human Rights and Duties	2017	<ol style="list-style-type: none"> 1. To expose the student about the concept of Environment and rights to clean environment. 2. To apprise the students about the International regimes for protection. 3. To understand the students about the role of various agencies for protecting environment with respect to human rights.
31.	HR 403 C	Human Rights and Criminal Justice System	2017	<ol style="list-style-type: none"> 1. To expose the student about the concept of the International Human Rights systems. 2. To understand the student about the International

				<p>Organisations for protecting the Human Rights.</p> <p>3. To understand the students about the UN Organs and Human Rights.</p>
32.	HR 403 D	Minorities and Human Rights and Duties	2017	<p>1. To student understand that the concept of evolutionary perspectives and Institutional mechanisms for protection of Minorities.</p> <p>2. To expose the student that rights and duties of Minorities under in the Indian System.</p> <p>3. To apprise the student that the Minorities and human rights challenges.</p>
33.	HR 405 A	Development, Globalization and Human Rights	2017	<p>1. Understand to role of Human Rights in Development and various theories of development.</p> <p>2. Analyses the new international Economic Order (NIEO), WTO GATT and International Trade and Human Rights Perspective in India.</p> <p>3. Evaluvate the Globalisation and its impact on agriculture, environment, labour, women, culture and health.</p> <p>4. Know about the Transnational Corporations (TNCs) and Human Rights violations and</p>

				Impact of GATT-WTO on sovereignty.
34.	HR 405 B	Women and Human Rights and Duties	2017	<ol style="list-style-type: none"> 1. To expose the students about the concept or the status of women in various sectors with respective human rights. 2. To expose students about the National and International norms for protection at International and National level. 3. To apprise the students about the Institutional mechanisms for Protection of rights of women.

Human Rights and Duties

S.No	Course Name	Course Code	Year of Introduction	Description of the course addressing Professional Ethics
1	Human Values and Professional Ethics-I.	HR -106	2017	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human behavior and actions in our daily lives. ➤ They inspire the fundamental goodness of human beings and society at large.
2	Human Values and	HR -205	2017	<ul style="list-style-type: none"> ➤ Students can understand the need and importance of human values and professional ethics which are essential for positive human

	Professional Ethics-II			<p>behavior and actions in our daily lives.</p> <p>➤ They inspire the fundamental goodness of human beings and society at large.</p>
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11. Law

S.No	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	CO -101	Mass Media Law	2017	<p>a. Have a detailed and sophisticated understanding of the general principles governing freedom of speech, the public interest and the media;</p> <p>b. Have a detailed, technical and specialised understanding of the constraints imposed on the media in the reporting of court proceedings;</p> <p>c. Have developed the ability to independently understand, research and critically analyse legal and scholarly developments that contribute to professional practice in the area of media law; and</p> <p>d. Have a detailed, technical and specialised understanding of defamation law in India and comparatively;</p>

				e. Have developed expert knowledge of the practical operation of defamation law in India and comparatively;
2	CO-102	Public Utilities Law	2017	<ul style="list-style-type: none"> a. government policy in regard to such utilities in general and to each utility in particular, b. The growth and evolution of the public utilities; c. patters of the laws of incorporation and d. powers, functions and liabilities of the public utilities vis-a-vis their employees, consumers and others.
3	CO- 103	Law and Social Transformation in India	<p>2017</p> <p>2017</p>	<ul style="list-style-type: none"> a. Critically analyse the Law as an instrument of social change and product of tradition and culture b. Explore the nature and function of Law as an institution and process interlinked with the social and economical philosophy of education. c. Examine development of law from historical processes and how for the a touch of modernization and value can be added to legal system d. To analyse the different approaches of Law and Justice
4	CO - 104	Indian Constitutional Law: The New Challenges	2017	a. Understand and interpret Constitution to address the emerging complex issues;

				<ul style="list-style-type: none"> b. Explore the various functional theories, doctrine and Constitutional principles working in the backdrop and its interplay with the emerging issues; and c. Examine the boundaries, limitations, of Constitution from different perspectives and explore the possible approaches of interpretation and understanding from the perspective of Law and Justice.
5	CO - 201	Union – State Finance Relations	2017	<ul style="list-style-type: none"> a. To understand India as development of complex federal structure (Quasi) federal and its strength and weaknesses; b. Explore the various functional theories, doctrine and Constitutional principles of federalism and its interplay under Indian Constitution; and c. To examine the area of conflicting interest between Union and State and primacy of Union over the State.
6	CO - 202	Constitutionalism, Pluralism and Federalism	2017	<ul style="list-style-type: none"> a. To explore the basic principles of Constitutionalism, different model of federalism and its interplay in the Indian legal system; b. To examine the adoption of, utility and justification

				<p>of Constitutional model in India; and</p> <p>c. To analyse India as pluralist society and suitability of various model, approaches in India in functional aspects of comparison with other legal system.</p>
7	CO – 203	Judicial Process	2017	<p>a. Intended to highlight the role of court as policy maker, participant in the power process and as an instrument of social change.</p> <p>b. expose the intricacies of judicial creativity and the judicial tools and techniques employed in the process.</p> <p>c. Since the ultimate aim of any legal process or system is pursuit of justice, a systematic study of the concept of justice and its various theoretical foundations is required.</p> <p>d. Intends to familiarise the students with various theories, different aspects and alternative ways, of attaining justice.</p>
8	CO – 204	Legal Education and Research Methodology	2017	<p>a. Critically analyse the various research skill, especially in the field of law;</p> <p>b. To develop the skill of application of teaching methods in legal education</p> <p>c. To understand and analyse the various strength and</p>

				<p>weakness of teaching learning and research process for the field of law; and</p> <p>d. To develop the skill of utilising computer technology for Legal education and Legal research.</p>
9	CO – 301	Human Rights	2017	<p>a. Acknowledge the social and economic rights of workers, forced labour, child labour, bonded labour, slavery, trade union, social security, right to health, standard of living, protection of families etc.</p> <p>b. To gain and acquire the knowledge about cultural rights of indigenous population.</p> <p>c. Understand the third-generation solidarity right of various populations.</p> <p>d. Acknowledge the ideas and knowledge about Human right Protection system of United Nations in the light of Covenant of Civil and Political rights.</p>
10	CO – 302	National Security, Public Order and Rule of Law	2017	<p>a. Understand and interpret various provision and safeguards to protection national security;</p> <p>b. To explore the various approach of public order, importance of rule of law and different legislations;</p> <p>c. Balancing the civil liberties and power of state; and</p> <p>d. Explore the various functional institution like election commission, parliament and check and</p>

				balance on the national importance.
11	CO- 303	Practical Training	2017 2017	<ul style="list-style-type: none"> a. Critically apply the understanding and application of legal research principles to legal research writing; b. To explore the various stages and its application for the practical record work; c. To have the development of idea, and its application; d. To have the ability to provide the original and non-plagiarised work to the existing field of knowledge e. Legal aid Camps and Legal Literacy Programmes, Court Observation work. f. On the completion of the course students will develop an inclination towards research and academics.
12	CO- 304a	Environment Protection and The Law	2017	<ul style="list-style-type: none"> a. Study the relationship between environment and climate change as well as the role of law, judiciary, resolution mechanisms but the alternate energy solutions and how people are dealing with climate changes, environmental laws and implementation of available solutions.

13	CO- 304b	Intellectual Property Rights Law	2017	<ul style="list-style-type: none"> a. To give philosophical underpinnings of traditional notion of property and IP • b. To examine the link between Industrial development & IP protection • To examine the conceptual development of IP concepts through judicial approach • c. To examine the impact of IP on economy, health and daily activities • d. To understand the basic principles enunciated in international agreements relating to IP
14	CO- 401	Dissertation and Viva-Voce	2017	<ul style="list-style-type: none"> a. Identify key research questions within the field of Demography on which you will carry out independent research. b. Manage your time effectively whilst working on your independent research. c. Demonstrate appropriate referencing and develop skills in other aspects of academic writing. d. Demonstrate knowledge and understanding of report writing. e. Apply the demographic/statistical research training acquired in the taught element of the programme by designing an appropriate research strategy and

				research methodology to carry out your research
15	CO – 402a	Law of Consumer Protection	2017 2017	<ul style="list-style-type: none"> a. Define provision under the Consumer Protection and Right to Information Act and apply them to situations accordingly b. Draft a consumer complaint with ease c. Confidently approach a Consumer Forum and get aware of the redressal mechanism d. To expose the students about Consumer Protection Laws; e. To develop the conceptual understanding of Consumer Protection regime.
16	CO- 404 b	International Human Rights (MOOC / ONLINE COURSE)	2017	<ul style="list-style-type: none"> a. Analyze and comment on key controversies surrounding the development of international human rights law b. Use conceptual tools to follow the developments of human rights law c. Be most effective in contributing to the enforcement of international human rights law

Hindi

S. No.	Course	Title of the Course	Years of	Course Outcomes
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	Code		Introduction	
1	101	Sahitya ka Itihas	2021	<ol style="list-style-type: none"> 1. The tradition of writing history of Hindi literature along with determining the time division of Hindi literature will get the knowledge of the background of the particular period of literature. 2. The origin and traditional development of the Bhakti literature and its trends and movements of particular period. 3. The development of ancient literary traditions in medieval poetry in the level of language, expressions and human kindness. 4. The form of devotional literature and achievement of the writers and philosophers in the Bhakti movements at national level.
2	102	Pracheen Evam Madhya Kaleen Kavya	2021	<ol style="list-style-type: none"> 1. Student will get information about ancient literature with especial study of Chandbardai, Vidyapati and Ameer Khusro. 2. Student will get the knowledge of the poetry of Kabeer, Tulasi, Jaysi and Surdash in medieval Hindi literature under the background of Bhakti movement. 3. Student will get the knowledge of the poetry of Bihari and Ghananand in Post medieval Hindi literature. 4. Overall the student will get knowledge of ancient and medieval literature in the practical study with their social and philosophical era.
3	103	Aadunik Kavita	2021	<ol style="list-style-type: none"> 1. Student will know the reflexion of independent movement and renaissance of Indian society in modern poetry. 2. Student will be able to get knowledge of their characteristics by knowing the

				<p>essence of the poems of pre independent poets.</p> <p>3. Student will know the subject, theme, characters, literary forms along with the development of Khari boli as the language of poetry.</p> <p>4. Knowing the movement of romanticism in Hindi literarture, theme of the poetry, love of the nature, feeling of the mankind and society in their poems.</p>
4	104	Samkaleen Kavitha	2021	<p>1. Knowledge of the poems of progressive, experimental, new and contemporary trends of poetry in Hindi.</p> <p>2. Student will get the meaning of the poems of different poets and their poetry, especial context to modern period.</p> <p>3. Student will get the knowledge of new trends of Hindi poems and its issues express by the poets in different manner to understand their present time.</p> <p>4. Student will understand the contemporary poems, its subjects, characters, ideology, their activities, reflections and reactions.</p>
5	105	(A) Samsamyik Kavita	2021	<p>1. Knowledge of the poems of contemporary trends-progressive, experimental, new and contemporary trends of poetry in Hindi.</p> <p>2. Student will get the meaning of the poems of different poets and their poetry, especial context to contemporary period.</p> <p>3. Student will get the knowledge of new trends of Hindi poems and its issues express by Femanist, Dalit and Tribble poets in different manner to understand their present time.</p> <p>4. Student will understand the contemporary</p>

				poems, its subjects, characters, ideology, their activities, reflections and reactions.
6	105	(B) Sahityik Andolan	2021	<ol style="list-style-type: none"> 1. Student will get knowledge of Bhakti movement of medieval period in arts, culture and literature. 2. Student will understand independent, romantic movement and its reflection in literature. 3. Student will be able to get knowledge of progressive and janvadi movement in Hindi literature. 4. Student will be get knowledge of Dalit, Tribal and Feminist movement in Indian society for democratic right to reformation and get equality in Indian society.
7	105	(C) Sahitya Ki Vaichariki	2021	<ol style="list-style-type: none"> 1. Student will know the litrary traditions and modernity, renecienss and indipendent movement along with philosophy in Hindi literature., 2. Renecienss in Indian society especial reference to Hindi speaking states and development of khariboli in Bhartenduyuga and Divediyuga. 3. Knowledge of various theories to understand the medievality and modernity, critical theory of history of literature and knowledge of historical materialistic development of philosophy. 4. Student will get knowledge of organic evolutional philosophy with different ideologies to understand constitutional rights, democracy, socilism, Gandhism Ambekarism and feminism in Hindi literature.
8	106	(A) BhashaVignan aur	2021	<ol style="list-style-type: none"> 1. They will acquire the knowledge of

		Hindi Bhasha		<p>definitions, types, divisions and braches of linguistics; understand the history of Indo-Aryan languages with origin and development of Hindi language.</p> <p>2. They know the background of development of linguistics and languages-like sociological, psychological, historical, cultural and ideological along with classification of Hindi sounds and knowledge of Hindi vocabulary.</p> <p>3. They will know the importance of language as communication source; understand the meanings, form and syntax, development of Hindi Pronouns and Devanagari script.</p> <p>4. They will understand the meaning of phonetics, directions of sound, nature of morphology, phonology and philosophy of language.</p>
9	106	(B) Patrakarita aur Jansanchar Madhyayam	2021	<p>1. They will get knowledge of the beginning of journalism and cultural development of Hindi journalism along with nature of mass media and the development of electronic media.</p> <p>2. Student will get the knowledge of independent journalism, genres of writing, concept of news and telecommunication, revolution of mechanical communication.</p> <p>3. They will know the general principles of editing, writing skills of journalism, fundamental rights and knowledge of electronic media.</p> <p>4. They will understand the working methods of mass media, development and</p>

				importance of internet in world media in present scenario.
10	107	Human values and Professional Ethics-I	2021	<ol style="list-style-type: none"> 1. Student will get knowledge nature of ethics and nature of values. 2. Student gaining knowledge of the ahimsa, satya, brahamacharya. 3. Student will get knowledge about Bhagvad Gita and Buddhism. 4. Gaining knowledge of the crime and theories of punishment.
11	201	Adhunik Sahitya Ka Itihas	2021	<ol style="list-style-type: none"> 1. There will get knowledge of various conditions of independent and renaissance era and the development of Hindi romanticism. 2. Student will get knowledge of various trends of romanticism, prograssivism and post colonial development of Hindi prose and its trends. 3. Student will get knowledge of pre and post independent trends of poetry and prose like novel, stories, dramas, one act plays, essays and criticism in modern Hindi literature. 4. Student will get knowledge with the development of traditions in modern era and their atmosphere, time, condition and directions in Hindi literature.
12	202	Katha Sahitya	2021	<ol style="list-style-type: none"> 1. Student will be able to understand the Indian society by reading the major novel of Hindi. 2. Student will be able to understand the various dimensions of human life depicted in the short stories of Hindi. 3. Students will be able to know the socio-political, cultural problems and goodness

				<p>by reading the characters depicted in Hindi short stories.</p> <p>4. Knowledge of socio-historical political background by reading the major characters of novels and short stories in Hindi.</p>
13	203	Natya Sahitya	2021	<p>1. Student will be able to understand the Indian society by reading the major play of Hindi.</p> <p>2. Student will be able to understand the various dimensions of human life depicted in the one act play of Hindi.</p> <p>3. Students will be able to know the socio-political, cultural problems and goodness by reading the characters depicted in Hindi one-act play.</p> <p>4. Knowledge of socio-historical political background by reading the major characters of drama and one act play in Hindi.</p>
14	204	Aalochana Sahitya	2021	<p>1. Knowledge of criticism of Hindi, its traditional base of development.</p> <p>2. Knowledge of criticism, its trends, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of criticism of Hindi writers, their trends, philosophical, critical and theoretical development in practical criticism and its values implemented by different critics.</p> <p>4. Importance of major critical trends and their critics, writing of criticism and their contribution in development of Hindi criticism.</p>
15	205	(A) Gadhya Sahitya	2021	<p>1. Knowledge of essays, autobiography of Hindi and its traditional base of development.</p>

				<p>2. Knowledge of essays, autobiography and its trends, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of essays, autobiography of Hindi writers and their trends, philosophical, theoretical development of essays, autobiography and its values implemented by different writers.</p> <p>4. Importance of essays, major autobiography, trends and contribution of their writers in development of Hindi essays and autobiography.</p>
16	205	(B) Anya Gadhya Sahitya	2021	<p>1. Knowledge of Hindi prose and its traditional base of development.</p> <p>2. Importance of prose, its trend, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of Hindi prose writers, their trends, philosophical and theoretical development of prose and its values implemented by different writers.</p> <p>4. Importance of major prose trends, their writers, writing of prose and their contribution in development of Hindi prose.</p>
17	205	(C) Andhra ka Hindi Sahitya	2021	<p>1. The tradition of writing Hindi literature by Hindi writers of Andhra along with determining the time division of Hindi literature and background of the periodical literature.</p> <p>2. The origin and traditional development of Hindi literature by Hindi writers of Andhra and its trends.</p> <p>3. The development of Hindi literature written by Hindi writers of Andhra, literary</p>

				<p>traditions in poetry and prose, development of Hindi language, expressions and human kindness by their writing in Hindi.</p> <p>4. The form and achievement of the writings, philosophical, socialological and pshycological background of their literature and contribution in national level.</p>
18	206	(A) Proyajan Mulak Hindi aur Rajbhasha	2021	<p>1. Knowledge of the various trends of Functional Hindi, Rajbhasha Hindi and its constitutional importance.</p> <p>2. Knowledge of key elements of Functional Hindi and correspondence language of central and state government official work.</p> <p>3. Student will get knowledge of correspondence and its types, official mailing, drafting, noting, corresponding types and its various forms in Functional Hindi.</p> <p>4. Student will get knowledge of official language Hindi, personal administrative, and finance and public relations management in Hindi language, utility of Hindi language in official level, letter writing and using of technical vocabulary.</p>
19	206	(B) Anuvad ke Sidhanth aur Prayog	2021	<p>1. Student will get to know of the form, process and methods of translation.</p> <p>2. Student will gain the knowledge of types of translation as well as problems of translation.</p> <p>3. Student will acquire the knowledge of translation tools and various branches of translation.</p> <p>4. Student will know the principle of construction, nature and importance of</p>

				translation in practical.
20	207	Human Values and Professional Ethics-II	2021	<ol style="list-style-type: none"> 1. Student will get knowledge of value education and medical ethics. 2. Student will get knowledge of the business and environment ethics. 3. Gaining knowledge of the social ethics.
21	301	Bhartiya Kavya Shastra Ki Parampara	2021	<ol style="list-style-type: none"> 1. Knowledge of the Achary tradition of Sanskrit poetics and the main principles of poetry soul. 2. Student will be familiar with the poetic theory of Sanskrit, Pali, Prakrit, Apabramsha and Hindi with their ideological trends of modern literary personalities. 3. Knowledge of ideological thinking of poetry, as principals of poetics in ancient, medieval and modern period of post independence era. 4. Knowledge of writings of poetics by Acharyas, poets in ancient and medieval period.
22	302	Hindi Kavya Shastra Ka Vikash	2021	<ol style="list-style-type: none"> 1. Student will get knowledge of thinking of modern writers, about the creativity, its aspects, responsibilities of writers, values of writing. 2. Student will known the contribution of writing and justification of creativities etc., by development of theoretical criticism in the base of modern ideological and philosophical. 3. Student will get knowledge of poetic developed by great Acharyas of Hindi by their writings and ideological conceptual development of modern poetics.

				4. Student will be able to know the poetic development of pre independent and post colonial period ie romantic poets, thinkers, prograssive writers, contemporary poets and literary personalities.
23	303	(A) Dalit Sahitya	2021	<ol style="list-style-type: none"> 1. Student will get to know the concept of dalit literature and literary movements, with philosophical base and its consciousness. 2. Student will get knowledge with the characteristics of dalit literature, ideological strength and philosophical power. 3. Student will get knowledge of traditional concept of dalit literature and the problems writing its own history. 4. Student will get knowledge of dalit literature in different form, its writers and literary trends like novel, short stories drama, one act play and autobiography etc.
24	303	(B) Adivasi Sahitya	2021	<ol style="list-style-type: none"> 1. Student will get knowledge with the concept of tribble literature and literary movements, philosophical base of tribble literature and its consciousness. 2. Student will get knowledge with the characteristics of tribble literature i.e ideological strength and philosophical power. 3. Student will get knowledge of traditional concept of tribble literature and the problems writing its own history. 4. Student will get knowledge of tribble literature in different form, its writers and literary trends like novel, short stories drama, one act play and autobiography etc.
25	303	(C) Narivadi Sahitya	2021	<ol style="list-style-type: none"> 1. Student will get the knowledge of nature of feminist thoughts and writings in Hindi.

				<p>2. Student will get the knowledge of the various dimensions of feminist thoughts in Hindi.</p> <p>3. Student will get the knowledge of the position and direction of female personalities.</p> <p>4. Student will get an opportunity to understand the literature like poetry, prose, short stories, novels and autobiography of feminist writers.</p>
26	303	(D) Pravasi Sahitya	2021	<p>1. Student will get the knowledge of nature of NRI thoughts and writing skill in Hindi</p> <p>2. Student will get the knowledge of the various dimensions of NRI thought in Hindi.</p> <p>3. Student will get the knowledge of the position and direction of NRI personalities.</p> <p>4. Student will get an opportunity to understand the literature like poetry, prose, short stories, novels and autobiography of NRI writings in Hindi.</p>
27	304	Bhash Shikshan ke Sidhanta aur Proyog	2021	<p>1. Student will get the knowledge of forms, process and methods of language teaching.</p> <p>2. Student will gain the knowledge of types of language teaching as well as problems of the same.</p> <p>3. Student will acquire the knowledge of language teaching, tools and various branches of language teaching.</p> <p>4. Student will know the principle of construction, nature and importance of language teaching in practical.</p>
28	305	(A) Vyavaharik Hindi	2021	<p>1. Student will get the knowledge of nature and</p>

		Vyakaram		<p>word wealth of Hindi language.</p> <p>2. Student will get the knowledge of the Devanagari scriupt, sound, vowels and consonants.</p> <p>3. Student will gain knowledge of the Hindi sentence, gender, words, factor and meaning of Hindi tenses.</p>
29	305	(B) Hindi Sahitya Ke Nirmatha	2021	<p>1. Student will get the knowledge of Ameer Khusro, Vidhayapati, Kabir, and Jayasi.</p> <p>2. Student will learn about the medieval poets- Sur, Tulsi, Meera, Raskhan, Rahim, Bihari and importance of their poetries.</p> <p>3. Student will be able to get the knowledge of ancient and medieval poets and poetry, especial reference to Bhakti movement.</p> <p>4. Student will be able to get information regarding literary trends, developed in pre modern period.</p>
30	401	Bharatiya Tulnatmak Sahitya	2021	<p>1. Student will get information about the comparative Indian literature, its concept and form of Indian literature and various stages of development.</p> <p>2. Student will able to understand the problem of writing, devotional consciousness of comparative Indian literature with cultural features and influencing thoughts.</p> <p>3. Knowledge of national independence movements, renaissance, romanticism, realism, progressivism and post colonial realistic consciousness reflected in comparative Indian literature.</p> <p>4. In comparative Indian literature, the knowledge of democratic values, subaltern studies with their philosophy, movement of</p>

				social reformation and identity in literature.
31	402	Paschatya Shashtra Samiksha	2021	<ol style="list-style-type: none"> 1. Student will get the knowledge of Plato's pre period and introduction to Greek thinkers. 2. Student will get the knowledge of western criticism from Plato to post modernist period. 3. Student will get an introduction to all types of modern literary critical theories and thinkers. 4. Student will get the knowledge of historical, philosophical development of western criticism by the different thinkers of various fields of knowledge and disciplines.
32	403	(A) Anudit Bhartiya Sahitya	2021	<ol style="list-style-type: none"> 1. Student will get the information about translated Indian literature, its concept, form of Indian literature and various stages of development. 2. Student will be able to understand the problem of writing, devotional consciousness of translated Indian literature with cultural features and influencing thoughts. 3. Knowledge of national independent movements, renaissance, romanticism, realism, progressivism and post colonial realistic consciousness reflected in translated Indian literature. 4. In translated Indian literature the knowledge of democratic values, subaltern studies, their philosophy, movement for social reformation and identity in literature.

33	403	(B) Asmitamulak Sahitya Vimarsha	2021	<p>1. Knowledge of contemporary criticism of dalit, femanist and tribble literary trends.</p> <p>2. Knowledge of contemporary criticism, its tread, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of contemporary criticism of Hindi writers, their trends, philosophical and critical theoretical development, practical criticism and its values implemented by different critics.</p> <p>4. Knowledge of major critical trends, their critics, writing of criticism and their contribution in development of contemporary criticism.</p> <p>1. Knowledge of contemporary criticism of dalit, femanist and tribble literary trends.</p> <p>2. Knowledge of contemporary criticism, its tread, philosophical background, ideological development and historical process.</p> <p>3. Knowledge of contemporary criticism of Hindi writers, their trends, philosophical and critical theoretical development, practical criticism and its values implemented by different critics.</p> <p>4. Knowledge of major critical trends, their critics, writing of criticism and their contribution in development of contemporary criticism.</p>
34	403	(C) Sahitya ka Tulanathmak Adhyayan	2021	<p>1. Student will get the knowledge of study of comparative literature with different methods, nature and problem of comparative literature and studies.</p> <p>2. Student will be able to know the study of comparative literature, research work and the</p>

				<p>role of translation etc.</p> <p>3. Student will gain the knowledge of comparative study of Hindi-Telugu literature.</p> <p>4. Student will get the knowledge of Hindi and Telugu literary trends and types of literature like novel, short stories, dramas, essays and subaltern studies of literature.</p>
35	403	(D) Anusandhan Ke Siddhanth aur Dristiya	2021	<p>1. Student will get the knowledge of nature, directions, types and methods of research like sociological, regional, textual, linguistic, poetics, comparative and psychological.</p> <p>2. Student will know the methods of selecting topic, collection of material, preparing of notes, writing and arrangement of thesis.</p> <p>3. Student will get the knowledge of interview, preparing of short notes, using of library, methods of preparing the notes, modification of thesis, editing, presenting, and writing of conclusion.</p> <p>4. Student will be able to know the using of critical theories in research of literature, logistical, linguist problems of research and searching the solutions in research.</p>
36	404	Antar Jananushasnatmak Drushtiya aur Pravidhiya	2021	<p>1. Student will know the poetics, spiritual, mythological, materialist, realist, romantics and views of study of literature.</p> <p>2. Student will be able to get Knowledge of sociological, historical, aesthetical and psychological vision of literature.</p> <p>3. Students will know about the new critical, modernist and post modernist, structural and post structural view of literature.</p> <p>4. Student will understand the linguistics,</p>

				stylistics, comparative, democratic, Ambedkarist, feministic, colonial and post colonial, Gandhian and humanitarian view of literature.
37	405	(A) Manak Hindi Aur Devnagari Lipi	2021	<ol style="list-style-type: none"> 1. Student will get the knowledge of Hindi forms, designs, vocabulary and sound composition and spelling problem. 2. Student will get the knowledge of formation of terminology, to know the development and use of Devnagari script in practice. 3. Student will know about the standard of Hindi, relation with grammar, use of Hindi language in oral and writing both levels.
38	405	(B) Adhunik Hindi Sahitya Ke Nirmata	2021	<ol style="list-style-type: none"> 1. Student will get the knowledge of the writer of modern Hindi. 2. Student will get the knowledge of the Hindi writers and their writings. 3. Student will be able to know about different trends of literature with writers.

12. Library and Information Science

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
1	LIS-101	Foundation of Library and Information	2017	1. Know the various types of libraries and their

		Science		<ul style="list-style-type: none"> role in the society 2. Learn the Professional ethics and library Legislation in India 3. Understand LIS education in India and various library associations in India
2	LIS102	Knowledge Organization: Classification Theory	2017	<ul style="list-style-type: none"> 1.. Understand the definition, need and purpose of classification 2. Learn the Fundamental Categories, Facet Analysis, types of Isolates in all schemes of classification 3. Understand the Notation, trends and developments in Classification
3	LIS-103P	Knowledge Organization:Classification Practice	2017	<ul style="list-style-type: none"> 1.Learn the Dewey Decimal Classification Scheme 2. Get the skill regarding assigning the class numbers 3.Have knowledge on Tables and Schedules of DDC
4	LIS-104	Knowledge Management	2017	<ul style="list-style-type: none"> 1.Get an idea on the concepts of knowledge

				<p>management, types of knowledge</p> <p>2.Understand the knowledge creation models, knowledge transfer in E-World</p> <p>3.know the tools for knowledge management and neural network and datamining</p>
5	LIS-105	Introduction to Information Technology	2017	<p>1.Gain knowledge on the concepts of computer basics and Network technologies</p> <p>2.Understand the concepts of Operating Systems, Programming Languages and types of softwares</p> <p>3.Learn the Database Management systems, steps in development of databases and get an idea on different library software packages</p>
6.	LIS-106	Human Values and Professional Ethics-I	2017	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be</p>

				<p>performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
7.	LIS-201	Information Sources and Services	2017	<p>1.Learn documentary and non-documentary sources and different types of information sources</p> <p>2.Know about the Indian and British National Bibliographies, and Electronic Books</p> <p>3.Understand the virtual reference service and translation Services</p>
8.	LIS-202	Knowledge Organization: cataloguing Theory	2017	<p>1.Understand the basic ideas on catalogue, forms of the catalogue, Main Entry and added entries</p> <p>2. Know the Canons, Principles and Laws of Cataloguing</p>

				3.Gain the knowledge on different types of subject headings, Cooperative and Centralized cataloguing .
9.	LIS-203P	Knowledge Organization: cataloguing Practice	2017	1.Gain knowledge on Anglo American Cataloguing Rules 2.Learn the preparation of Main entry and added entries for monographs and serial publications 3. Gain the skills on preparation of entries on cartographic materials, manuscripts and sound recordings
10.	LIS-204P	Meta data Standards- Practice	2017	1.Know the Metadata and its types, standards 2. Learn the skills on KOHA Software 3.Learn the skills on MARC 21 and Dublincore
11	LIS-205	Library Management	2017	1.Gain knowledge on meaning and purposeofmanagement, Organizational Structures 2.Able to identify the factors behind selection, procurement and accessioning of documents

				3.Gain knowledge on a circulation system suitable for a library, different budgetary methods and its standards, norms and principles
12	LIS-206	Human Values and Professional Ethics-II	2017	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	LIS-301	Information Processing and Retrieval Theory	2017	<p>1.Understand the basic concepts on Information procession and Retrieval and various schemes on classification</p> <p>2.Learn the Indexing Systems and Techniques and their Evaluation Criteria and Studies</p> <p>3.Gain knowledge on Web based Information Retrieval Systems</p>
14	LIS-302	Library Automation and Digital Library	2017	1.Learn the basics of Library Automation, various modules of library automation software

				<p>packages and their features</p> <p>2.Gain knowledge on basic concepts and characteristics of digital libraries</p> <p>3.Know about network and communication devices, digitization and metadata</p>
15	LIS-303	Search and Search strategies	2017	<p>1.Gain knowledge on search strategies, various types of databases, internet searching tools</p> <p>2.Understand Z39.50 protocol and Wide area information servers</p> <p>3. 3.Learn the search engines and meta search engines.</p>
16	LIS-304B	Internship	2017	<p>1.Attain skills on all types of sections and its maintenance in libraries in which they underwent training</p> <p>2.Get skills on maintenance of Digital Library</p> <p>3.Learn the skills on preservation and conservation of manuscripts and digitization.</p>
17	LIS-304C	Academic Library System	2017	<p>1.Know the basic objectives, growth and development of Academic Libraries in India, UK and USA</p> <p>2.Learn about an overview of higher education in India, UGC, its powers and functions and its role</p>

				<p>in the development of academic libraries</p> <p>3.Understand the total design of the building, techniques of financial management, and know the organization of library and information services needed by distance learners and special users</p>
18	LIS-305A	Information Literacy (OE)	2017	<p>1.Learn the concepts of Information Literacy and sources of Print and Electronic Information</p> <p>2.Get the skills on information access through INFLIBNET Network</p> <p>3.Able to understand the Internet and its search techniques and Intellectual Property Right</p>
19	LIS-401	Research Methodology	2017	<p>1.Understand the definition, need and purpose of various research methods</p> <p>2.Get the knowledge on Research design, techniques and tools</p> <p>3.Gain the skills on Data analysis and Interpretation of Data in SPSS.</p>
20	LIS-402P	Software for Libraries-Practice	2017	<p>1.Attain knowledge on D Space, GreenstoneDigital Library Softwares</p> <p>2.Learn about Koha : Library Management Software, E-Resources, Directory of Open</p>

				Access Journals, 3.Get an idea on designing of Web Page and Data Mining
21	LIS-403	Dissertation/Project Work	2017	1.Gain Knowledge on how to select the theme for their work 2.Learn the writing styles, preparation of questionnaire, data analysis and interpretation and Citation styles 3.Get the skills on findings and conclusion in dissertation
22	LIS-403A	Management of Information System	2017	1.Know the basic concepts in Management, and various methods of decision-making and its application to Library and Information Centers 2.Understand the budgeting techniques and methods and policies and procedures 3.Gain knowledge on system analysis, PERT/CPM
23	LIS -404C	Information Processing and Retrieval: UDC and Indexing Practice	2017	1. 1.Gain knowledge on Universal Decimal Classification 2.Learn different Indexing systems 3.Understand the design and development of

				thesaurus
24	LIS-405-B	Technical Writing	2017	1. Know the definition and types of technical writing 2. Attain the idea on technical writing process and styles 3. Get the skills on technical writing techniques, use of MS-Office for preparation and presentation of technical writing

13. Performing Arts (Music)

S.No	Course Code	Name of the Course	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1	162	MA Performing Arts(Music)	2017	PAM-105 (P) Compulsory Foundation in Music -1 Clear cut training of foundation in Carnatic Music
2	162	MA Performing Arts(Music)	2017	PA-M 204 (P) Vilambakala Kritis Training to Perform slow tempo songs which is difficult rather than fast tempo songs
3	162	MA Performing Arts(Music)	2017	PA-M 205 (p) Compulsory Foundation in Music -2 Clear cut advance level training of foundation in Carnatic Music
4	162	MA Performing Arts(Music)	2017	PA-M 302 Compositions in Rare ragas widening knowledge to perform rare ragas

5	162	MA Performing Arts(Music)	2017	PA-M 303 Concert Ability to plan and execute a successful Carnatic concert Ability to create self employment opportunity
6	162	MA Performing Arts(Music)	2017	PA-M 402 Ragam Tanam Pallavi Learn and inculcate the most creative part of Carnatic Music To help student to shape out the creative rendering style of the student
7	162	MA Performing Arts(Music)	2017	PA-M 403 Project work Introduce to the methodology of doing research in music and introducing to data collection, analysis etc and train up him to look into the facts based on evidences
8	162	MA Performing Arts(Music)	2017	PA-M 404A Manodharma Sangeetha To enrich the knowledge of innovative music To educate the student to sing raga alapana neraval and Kalpanaswara which are the crucial Sections of creative music.
9	162	MA Performing Arts(Music)	2017	PA-M 404C Compositions of Dance Repertoire Knowledge in application of music in other art fields like theatre, opera etc Knowledge to select and utilize ragas according to the theme and text.

14. Philosophy

1.	Course Code	Title of the Course	Years of Introduction	Course outcome

2.	101	Classical Indian Philosophy	2017	<p>1. The Student has applied the knowledge of classical Indian Philosophy.</p> <p>2. The Student has analyzed the principles of classical Indian Philosophy</p>
3.	102	Epistemology Indian	2017	<p>1. The Student has known the Indian Epistemology</p> <p>2. The Student has understood the Pramanas in Indian Philosophy</p>
4.	103	Logic Indian and Western	2017	<p>1. The Student has known the Indian Epistemology</p> <p>2. The Student has understood the Pramanas in Indian Philosophy</p>
5.	104	Western Philosophy- Greek and Medieval	2017	<p>1. The Student has known the important issues of Western Philosophy</p> <p>2. The Student has understood the Principles of greek and medieval Philosophy</p>
6.	105-A	Problems in Metaphysics	2017	<p>1. The Student has known the Problems of Metaphysics</p> <p>2. The Student has understood the Principles of Metaphysics</p>
7.	202	Ethics- Indian	2017	<p>1. The Student has known the Ethics in Indian Philosophy</p>

				2. The Student has understood the various Ethical Principles in Indian Ethics.
8.	203	Ethics –Western	2017	1. The Student has known the Ethics in Western Philosophy 2. The Student has understood the Ethical theories of Western Philosophy
9.	204	Modern Western Philosophy	2017	1. The Student has known the Problems of Modern Western Philosophy 2. The Student has understood the thoughts of Modern Western Philosophers.
10.	205-A	Philosophy of Education	2017	1. The Student has known the Contents of Philosophy of Education. 2. The Student has understood the Educational aspects of Philosophy of Educatio
11.	207	Audit course (HVPE)	2017	1. The Student has known the essence contents of human values. 2. The Student has understood the Professional Ethics..
12.	301	Social and Political Philosophy	2017	1. The Student has known the contents of social Philosophy. 2. The Student has understood the Principles of Political Philosophy.

13.	302	Philosophy of Vedanta	2017	<p>1 . The Student has known the Philosophy of Vedanta.</p> <p>2. The Student has understood the Philosophical Doctrines of Vedantas</p>
14.	303-A	Philosophical Approach to Gandhi	2017	<p>1. The Student has known the metaphysical issues of Gandhi.</p> <p>2. The Student has understood the Gandhian Philosophy</p>
15.	303-B	Philosophy of B.R.Ambedkar	2017	<p>1. The Student has analyzed the Philosophy of Ambedkar..</p> <p>2. The Student has applied the Philosophical aspects of Ambedkar.</p>
16.	305-A	Philosophy of Value Education	2017	<p>1.The Student has known the importance of Education...</p> <p>2. The Student has understood the Philosophical values for life.</p>
17.	305-B	Sri Venkateswara Studies	2017	
18.	401	Phenomenology and Existentialism	2017	<p>1. The Student has analyzed the contents of Phenomenology..</p> <p>2. The Student has applied the Philosophical Principles of Existentialism</p>

19.	402	Comparative Religion	2017	<p>a.The Student has analyzed the aspects of Comparative Religion..</p> <p>b. The Student has applied the Philosophical Principles of different Religions</p>
20.	403-A	Philosophy of Jiddu Krishnamurti	2017	<p>1.The Student has known the Philosophy of Jiddu Krishnamurti...</p> <p>2. The Student has understood the Philosophical insights and of jiddu Krishnamurti</p>
21.	403-B	Analytical Philosophy	2017	<p>1. The Student has known the contents of Analytical Philosophy.</p> <p>2. The Student has understood the Philosophy of Philosophers of Analytical Philosophy..</p>
22.	403-C	Sri Vaishnavism	2017	<p>1.The Student has analyzed the aspects of SriVaishnavism..</p> <p>2. The Student has applied the Philosophical Principles of .SriVaishvaism</p>
23.	403-D	Research Methodology and Computer Applications	2017	<p>1. The Student has analyzed the principles of Research Methodology..</p> <p>2. The Student has applied the computer operating and applying principles</p>
24.	404		2017	

		Philosophy of Peace		
25.	405-A	Philosophy of Yoga	2017	<p>1. The Student has analyzed the principles of Research Methodology..</p> <p>2. The Student has applied the computer operating and applying principles</p>

15. Physical Education

S.No	Name of the Course	Course Code	Year of introduction	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development
1	B.P.Ed	Bachelor of Physical Education	2014-15	100%
2	Ph.D	Ph.D	2008	100%

16. Population Studies

S.No.	Course Code	Title of the Course	Years of Introduction	Course outcome
1.	PS- 101	Population Characteristics and Theories	2017	<p>i. Identify basic demographic concepts and definitions in Population studies</p> <p>ii. Impart knowledge on Population trends in size</p>

				<p>and growth of population at regional, national and global level.</p> <p>iii. Discover the implications of different theories on past and present population components with special reference to Malthusian theory</p>
2.	PS - 102	Fertility	2017	<p>i. Examine the basic concepts and measurements of fertility</p> <p>ii. Assess, compare and contrast trends in fertility and its determinants</p> <p>iii. Familiarize the concepts of nuptiality and factors affecting nuptiality</p>
3.	PS – 103	Mortality	2017	<p>i. identify the various concepts and measures of mortality</p> <p>ii. Examine the global levels and trends in mortality and its determinants</p> <p>iii. Acquire knowledge on techniques of life tables, constructions of multiple-decrement life table and computational aspects for demographical analysis</p>
4.	PS 104	Sources, Evaluation and Adjustment of Data	2017	<p>i. Examine and compare merits and demerits of various sources of population data</p> <p>ii. Understand the evaluation of data, factors affecting completeness of data</p>

				iii. Reproduce knowledge on population projections, calculations and applications
5.	PS – 105	Population Education and Extension	2017	<ul style="list-style-type: none"> i. Examine the components of population education and create awareness on population education among the students and youth ii. Acquire skills to organize Extension Programmes in population education at school, college and Non formal educational levels iii. demonstrate training on population education methods and techniques in order to create awareness on population education
6.	PS - 106	Human Values and Professional Ethics-I	2017	<ul style="list-style-type: none"> i. Identify the concepts of ethics and its relation to religion, politics and environment ii. Memorize the different aspect of values and interpret the best skills in understanding the merits of value related aspects iii. Demonstrate to interpret crime and theories of punishment with special reference to acquire knowledge on Manu and Yajnavalkya
7.	PS – 201	Migration and Multi Regional Demography	2017	<ul style="list-style-type: none"> i. Explore the different types and trends in migration ii. Apply skills in measurement, causes and

				<p>consequences of different migrations in different regions</p> <p>iii. Explore the theories and recommend suitable policies of migration</p>
8.	PS – 202	N.G.O Management & Field Work Orientation	2017	<p>i. Understand the role, importance and establishing of NGO</p> <p>ii. Explore the sources of funding of NGO’s at national and international level</p> <p>iii. Explore demographic data by working with individuals, groups and communities</p>
9.	PS - 203	Statistical Methods	2017	<p>i. Familiarize the basic statistical methods and its applications to demographic data</p> <p>ii. Demonstrate knowledge on methods and techniques of sampling</p> <p>iii. Acquire skills in processing of data with computer</p>
10.	PS - 204	Population Sociology	2017	<p>i. Examine the basic sociological concepts, and evaluate the relationship of sociology to other social sciences</p> <p>ii. Identify the social institutions, social change and socialization</p> <p>iii. Explore the sociological theories of fertility and</p>

				its application in contemporary society
11.	PS - 205	Fundamentals of Social Work	2017	<ul style="list-style-type: none"> i. Memorize the basic concepts of social work and its nature and scope. ii. Recognize the different methods of social work iii. Explore the social work practice in different fields iv. Acquire knowledge on the evolution of social work in India v. Explore the professional associations and importance of networking in social work profession
12.	PS – 206	Human Values and Professional Ethics - II	2017	<ul style="list-style-type: none"> i. Acquire and gain knowledge on different concepts of human values and behavioural changes. ii. Recognizing the medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics of medical and health care professionals. iii. Acquire skills on environmental ethics and its relation to Health
13.	PS - 301	Population Geography	2017	<ul style="list-style-type: none"> i. Enumerate the geographical factors affecting the distribution of population ii. Awareness and understanding of trends in urbanization and its impact on ecological

				<p>imbalance, global warming, greenhouse effects.</p> <p>iii. Able to assess changing pattern of land use, conservation of resources and critical thinking of policies, programmes for better management of environment</p>
14.	PS - 302	Research Methodology	2017	<p>i. Demonstrate in conducting population research and surveys</p> <p>ii. Prepare research design and apply sampling techniques</p> <p>iii. Discover skills in methods and tools of data collection, data analysis, interpretation, and report writing.</p>
15.	PS - 303	Community Health	2017	<p>i. Discover comprehensive knowledge on concepts of community health, illness, disease prevention</p> <p>ii. Critical thinking on epidemiology, communicable diseases and its prevention</p> <p>iii. Understand and appreciate the concepts of health, nutrition, balance diet, nutrition deficiency diseases and National Health Programmes</p>
16.	PS – 304 a	Population Psychology	2017	<p>i. Appreciate the scope of psychology and the relationship between value of children and fertility</p>

				<ul style="list-style-type: none"> ii. Familiarize and comprehend the significant psychological theories relevant to fertility and contraceptive behavior iii. Demonstrate leadership and effective communication skills in promoting health and family planning
17.	PS – 304 b	Population Policies and Programmes	2017	<ul style="list-style-type: none"> i. Explore population policies related to fertility, mortality and migration ii. Acquire the knowledge on methods of family planning and acts relating to medical termination of pregnancy, age at marriage and also registration of vital events iii. Apply best practices and strategies for promoting family welfare programme.
18.	PS – 304 c	Gerontology	2017	<ul style="list-style-type: none"> i. Understand the scope of gerontology and demographic dimensions of the elderly ii. Critically explore and analyze changes in status of elderly health, problems and needs of elderly iii. Acquire skills in dealing elderly issues like neglect, abuse, violence and abandonment caregivers stress and elderly neglect
19.	PS – 304 d	Population and Sustainable	2017	<ul style="list-style-type: none"> i. Examine the concepts and theoretical issues

		Development		<p>relating to sustainable development and sustainable goals</p> <p>ii. Assess and measure the quality of life, resource creation, and management and distribution</p> <p>iii. Critically think of the relationship between population, environment, poverty and population sustainable growth</p>
20.	PS-305 a	Principles of Population Studies	2017	<p>i. Explore the components of population change, trends in size and growth of population</p> <p>ii. Discover the concepts of fertility, mortality and migration</p> <p>iii. Acquire skills in exploring the sources and quality of data on fertility, mortality and migration</p>
21.	PS – 305 b	Population, Society and Environment	2017	<p>i. Understand the components of population change and sociological consequences</p> <p>ii. Demonstrate sociological perspective to analyze the relationship between man, ecology and environment</p> <p>iii. Critical thinking of Sustainable development and its concepts</p>
22.	PS - 401	Communication for Family Welfare Programmes	2017	<p>i. Examine the elements in communication process</p> <p>ii. Understand and apply different approaches to</p>

				<p>communication</p> <p>iii. Critically analyze and apply factors influencing a various communication methods to promote family planning</p>
23.	PS – 402	Reproduce Health and Adolescent Issues	2017	<p>i. Examine the anatomy and physiology of human reproduction, conception and pregnancy</p> <p>ii. Describe the male and female reproductive health problems</p> <p>iii. Assess and examine various adolescent issues</p>
24.	PS - 403	Population Growth and Development	2017	<p>i. Understand the indicators of development with special reference to population growth and development.</p> <p>ii. Discover the concepts of economic inequality and its causes</p> <p>iii. Examine the status of women and development and demographic consequence of women empowerment</p>
25.	PS – 404 a	Dissertation	2017	<p>i. Develop in-depth knowledge of field work and community surveys</p> <p>ii. Acquire the skills to present and discuss the findings through seminars</p> <p>iii. Explore the skills in preparation and presentation</p>

				of research findings
26.	PS – 404 b	Demography of Andhra Pradesh	2017	<ul style="list-style-type: none"> i. Acquire knowledge on basic trends and changes in population growth in Andhra Pradesh ii. Examine the migration and urbanization, problems of slums and related policies with special reference to Andhra Pradesh iii. Explore the population policies and programmes in Andhra Pradesh
27.	PS – 404 c	Social Work in Industry and Human resource Management	2017	<ul style="list-style-type: none"> i. Understand the concepts, principles and functions of Management ii. Acquire skills on difference process of Human Resource management iii. Demonstrate the organizational behavior, management conflicts and organization of interventions iv. Concepts of Industrial relations and related legislations for industrial workers
28.	PS – 404 d	Health Economics	2017	<ul style="list-style-type: none"> i. Explore the concepts in economics in relation to health and population dynamics ii. Acquire skills in assessing costing and health economics

				iii. Critically analyze and evaluate general health status and quality of life and also measurement of health outcomes
29.	PS – 405 a	Rural, Urban, Tribal Development	2017	<ul style="list-style-type: none"> i. Explore the characteristics of rural, urban and tribal community ii. Discover community development and experiment projects in rural, urban and tribal areas iii. Critically examine and understand the issues related to rural, urban and tribal areas and approaches to community development
30.	PS – 405 b	Social policies and planning	2017	<ul style="list-style-type: none"> i. Discover social policies in relation to Indian constitution. ii. Examine the approaches to social policy iii. Demonstrate and analyze various social policies and their implementation

Masters in Social Work

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcome
1.	MSW- 101	Sociology for Social Work	2017	<ul style="list-style-type: none"> i. Discover basic concepts in Sociology and examine the relation between individual and society.

				<ul style="list-style-type: none"> ii. Distinguish between Socialization, Social institutions and Social groups iii. Critically demonstrate , Social Stratification, Social Deviance, Social Change and Social Problems
2.	MSW - 102	Human Growth and Personality Development	2017	<ul style="list-style-type: none"> i. Memorize various stages of Human Growth and Development ii. Identify different concepts of Human Behavior like Motivation, Perception, Learning and Attitudes iii. Discover experience in assisting the person in Solving their Psycho social problems through personality development and adjustment
3.	MSW – 103	Social Work Profession & Field Work Orientation	2017	<ul style="list-style-type: none"> i. Recall various concepts like Social Service, Social Welfare, Social Development and Social Work ii. Experiment on Ethical Values of Professional Social Work and analyze current trends in Social Work iii. Design field work in Social Work and acquire skills to involve the client in problem solving process
4.	MSW 104	Social Work Practice with	2017	<ul style="list-style-type: none"> i. Recognize the basics Concepts , Techniques and

		Individuals & Groups		<p>Skills of case work</p> <p>ii. Apply different approaches of Case Work, Group Work</p> <p>iii. Evaluate the application of Social Case Work and Group Work at various settings like Schools, Hospitals, and Correctional Settings and in Communities.</p>
5.	MSW – 105	Social Work Practicum - I	2017	<p>i. Recognize the significance of Social Work in various settings</p> <p>ii. Illustrate the application of Social Work Methods in the agencies during their field practicum</p> <p>iii. Examine the applications of Social Work Principles and Skills in the functions of different organizational systems</p>
6.	MSW - 106	Human Values and Professional Ethics-I	2017	<p>i. Familiarize the concepts of ethics and its relation to Religion, Politics and Environment etc.</p> <p>ii. Able to gain knowledge on different aspect of Values and Interpret the best Skills in understanding the merits of value related aspects</p> <p>iii. Discover to interpret Crime and Theories of Punishment with special reference to Manu and Yajnavalkya</p>

7.	MSW – 201	Social Work Profession & Field work Orientation	2017	<ul style="list-style-type: none"> i. Recognize the Scope, Importance and Significance of Social Work Practice in different fields ii. Acquire Knowledge and Skills Essentials for Working with Groups and Communities iii. Formulate Capacity Building by organizing training and awareness programmes in the Field Work Settings
8.	MSW – 202	Social Work Practice with Communities	2017	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in Community organization and Social Work practice ii. Appraise various approaches in Community Organization and Current issues in Community Organisation iii. Organize community participation using PRA methods and techniques
9.	MSW - 203	Social Action and Social Legislation for Social Work Practice	2017	<ul style="list-style-type: none"> i. Distinguish the elements of Social action, Models and Process of Social Action ii. Connect the Social Legislations with Social Work Practice iii. Appraise Laws pertaining to Women, children and Aged in Social work practice

10.	MSW - 204	Social Policy and Planning	2017	<ul style="list-style-type: none"> i. Examine the nature and Approaches of Social Policy in the Socio-economic and political context ii. Assess the implementation of Social Welfare Policies in Education, Health, Women, Children and Environment iii. Examine the Role of Social Workers in Formulating , Planning and Implementation of Social Policies
11.	MSW - 205	Social Work Practicum-II	2017	<ul style="list-style-type: none"> i. Examine the Nature, Scope and Functions of the different Government and non-profit organizations agency at ground level ii. Trained to assist their supervisor with in the limitations of the agency iii. Equipped with Professional Skills and Techniques through practical exposure
12.	MSW – 206	Human Values and Professional Ethics - II	2017	<ul style="list-style-type: none"> i. Summarize different concepts of Human Values and Behavioural changes required for adjustment in Family and Society ii. Demonstrates Medical ethics and views of Charaka, Sushruta and Hippocrates on moral ethics in Medical and Health care professionals.

				iii. Acquire Skills on Environmental ethics and the Environment and Health
13.	MSW - 301	Social Work Intervention with Families	2017	<ul style="list-style-type: none"> i. Discover the Family Centered Practice as a Model of Social Work practice and understand Family life management and Family Dynamics ii. Demonstrate Family Assessment and Application of Tools : Interviewing , Ecological assessment – Eco map , Generation assessment- Genogram, Triangle, Family Sculpture and Family Mapping iii. Integrate social work practice with Families and Social Work Therapeutic Interventions wherever appropriate
14.	MSW - 302	Social Work in the Field of Health	2017	<ul style="list-style-type: none"> i. Examine the concept of Health, factors affecting health and Indicators of Health. ii. Evaluate Primary and Community healthcare services with special references to communicable and Non-communicable diseases iii. Assess the relevance, domains and nature of Social Work Intervention in different Health settings.
15.	MSW - 303	Counseling in Social Work Practice	2017	<ul style="list-style-type: none"> i. Understanding the basics of Counseling and

				<p>Approaches of Counseling</p> <ul style="list-style-type: none"> ii. Develop ability to apply appropriate Counseling Techniques with Special Group iii. Demonstrate to apply Counselling Skills while working with clients in various settings like Health ,Family and School Settings
16.	MSW – 304 a	Social work Research	2017	<ul style="list-style-type: none"> i. Acquainted with advanced level of knowledge in Social Work Research process and Statistics ii. Illustrate single subject and evaluation Research Designs along with various Research designs iii. Facilitate methods of Sampling, Data Collection, Analysis, Statistical-Applications and Report Writing
17.	MSW – 304 b	Gerontological Social Work	2017	<ul style="list-style-type: none"> i. Identify theScope of Social Work in the field of Gerontology. ii. Illustrate Changes in the status of Elderly, Health problems and needs of Elderly. iii. Experiment the social work interventional strategies to Elderly ,Care givers and Counseling
18.	MSW – 304 c	Social Work Practicum-III	2017	<ul style="list-style-type: none"> i. Analysis the role of Community and dramatize the Community Organisation in field work practice ii. Develop skills and expertise their Field Work

				<p>exposure to organize community programmes</p> <p>iii. Examine the new Intervention programs in the area of their specialization to bring a solutions to the problems in different community</p>
19.	MSW – 304 d	Human Rights and Social Legislation	2017	<p>i. Acquainted with advanced level of knowledge in Human rights</p> <p>ii. Distinguish various Social Legislations and Legislations related to Women and Children</p> <p>iii. Nurture the Social Work Professionals by creating awareness on various current issues and related Legislations</p>
20.	MSW-305 a	Principles of Population Studies	2017	<p>i. Demonstrate the concept of Population Studies, Components of Population Change Population Structure</p> <p>ii. Interpret basic concepts and measures of Fertility, Mortality ,Mobility and Migration</p> <p>iii. Critically evaluate the Concept of Multi Regional Demography, its uses and limitations</p>
21.	MSW – 305 b	Fundamentals of Social Work	2017	<p>i. Examine basic concepts, Principles and Methods of Social Work</p> <p>ii. Defend values and Principles of Professional Social Work and Code of ethics for Social</p>

				Workers iii. Evaluate Social Work Education in India, Professional Associations, Problems of Professionalization and Networks in Social Work
22.	MSW - 401	Social Work Intervention with Children	2017	i. Examine the Significance and Development of Child Welfare Services with special reference to Child Rights ii. Appraise various Institutional and Non-Institutional services for children in need iii. Create Professional Knowledge on Social Work Intervention with children in difficult situations
23.	MSW – 402	Rural/Urban/Tribal Development & Empowerment –I	2017	i. Acquainted with advanced level of knowledge in rural Urban and Tribal community and Community Development Projects across the country ii. Trained to meet the challenges specifically related to Rural, Urban and Tribal communities iii. Will nurture the Social Work Professionals to become effective Social Worker and contribute to community by conducting awareness camps, strengthening Self-Help Groups and Facilitating Empowerment in the communities.

24.	MSW - 403	Social Work in the Field of Mental Health	2017	<ul style="list-style-type: none"> i. Understand the concept and importance of Mental Health and Psychiatric Social Work ii. Distinguish Psychiatric disorders and application of Therapeutic Interventions in Psychiatric Illness iii. Plan to provide Psychiatric Rehabilitation to assist Mentally Ill patients
25.	MSW – 404 a	Social Work in Industry & Human Resource Management	2017	<ul style="list-style-type: none"> i. Enrich knowledge on HRM, Personnel management, HR planning and ii. management systems iii. Appraise organizational behavior, conflict Resolution Strategies and Legislation related to industrial relations iv. Develop skills in Industrial Social Work Practice and the role and significance of Corporate Social Responsibility
26.	MSW – 404 b	Social Work Practicum-IV	2017	<ul style="list-style-type: none"> i. Acquires training in the organization as social worker and develop sound knowledge on social work which will motivate them to start an NGO ii. Evaluate projects and organize programmes for fund raising iii. Hypothesize research in their area of specialization through which they can suggest recommendations

				to agencies for improving quality
27.	MSW – 404 c	Social Work Practicum-V	2017	Learn Skills and able to apply Principles during the Internship in Block Placement Explore research studies at Micro levels and submit reports as Mini Project Work Demonstrate as effective Social Worker in the agency in which they are placed
28.	MSW – 404 d	Social Work and Disaster Management	2017	<ul style="list-style-type: none"> i. Summarize and understand the disasters and Disaster Management ii. Acquire a critical perspective of the policy framework, Institutional Structures and programmes for Disaster Management in India iii. Explore Mental health consequences and able to provide Psychosocial care in Disaster Management
29.	MSW – 404 a	NGO Management	2017	<ul style="list-style-type: none"> i. Distinguish the Concept, Structure, Registration and By laws of NGOs ii. Demonstrate Organisational Management and source of funding of NGOs iii. Familiarize to organize Human Resource Management in NGOs
30.	MSW – 404 B	Health Education	2017	Discover the Roles, Responsibilities, Approaches and ethics in Health Education

				Describe the Behavioral, Environmental, and Genetic risk factors for Communicable and Non- communicable diseases. Evaluate channels of Health education and organizational health set up at Central, State and District levels
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17. Sanskrit

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcome
1	SNSKT 101	Elements of Darsanas-I	2017	An understanding of the evolution of Darsanas I.To create an awareness of the Darsanas ii.Acquire Knowledge of the Baudda and Jaina Darsanas iii.To get the Knowledge of Meemamsa Sastra
2	SNSKT-102	Vedic Texts-I	2017	I.Students able to get the Vedic knowledge II.Students know the importance of Vedic gods III.Students are understanding the Vedic chandas IV.To make understanding the spiritual knowledge through Kathopanishat
3	SNSKT-103	PROSE AND POETRY-1	2017	I.An understanding of evolution of Sanskrit poetry across the ages until the modern age II.Get the knowledge of gadya kavya III.Understand the poetical skills

				IV. Understand the importance of kiratarjuneeya in Sanskrit literature
4	SNSKT-104	DRAMA, ALANKARA AND PROSODY -1	2017	<p>Student will be able to get</p> <p>I. Understanding the features of Sanskrit drama</p> <p>II. Knowledge of organ and development of Sanskrit dramas</p> <p>III. Understanding the efficiency of kalida's poetic skill.</p> <p>IV. Get the knowledge of chandas</p> <p>V. Get the knowledge of different types of chandas</p>
5	SANSKT105 (A)	HISTORY OF SANSKRIT LITERATURE – 1	2017	<p>After completed of course the students are able to</p> <p>I. Know the origin and development of Sanskrit literature</p> <p>II. Know the importance of Vedas and its date.</p> <p>III. Know the meaning and contest of Brahmanas, Aranyakas and Upanishads</p> <p>IV. Know the social conditions as reflected in the Brahmanas</p> <p>V. Know the importance of Ramayana and its date</p>
6.	SANSKT :105(B)	DRAMA AND POETRY -1	2017	<p>I. Students will be able to gain understanding the features of Drama, Sentiment Moralities</p> <p>II. Through understanding the importance and place of Rasa in the Drama</p> <p>III. The knowledge about the skillfulness of Bhavabhutis Dramatergy</p> <p>IV. Recognize the transpiration of human experiences into dramatic experiences</p>

				V.The knowledge about importance of Sandesa Kavyas in Sanskrit Literature
7.	SANKT :105(C)	ALANKARA AND PROSODY - 1	2017	I.Students will understand the different types of Alankara II.Know the importance of Alankara in the poetry III.Understand the development of on the basis of similar IV.Recognize the Guru and Laghu in prosody V.Know the importance of melody through prosody
8.	SANSKT:10 6(A)	COMPARATIVE PHILOLOGY AND SIDDHANTA KOUMUDI- 1	2017	After complication of the course students are able to- I.Find out the main causes of semantic change II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing skills without grammatical mistakes..
9.	SANSKT:10 6 (B)	KAVYALANKARA SUTRA VRITTI -I	2017	I.Know the definition of poetry and prose II.Know the different types of Kavya III.Understand the different types of Riti IV.Understand the Pada and Padartha Doshas.
10.	SANSKT:10 7	HUMAN VALUES AND PROFESSIONAL ETHICS -I	2017	After completion of the course students are able to I.Understand Bhagavad Gita as a guide for modern life style II.Know the principles of Buddhism and Jainism

				<p>III. Realize the necessity of practicing Human values and ethics in walks of life</p> <p>IV. Acquire the knowledge of Good and Bad</p> <p>V. Know the about crime and punishment according manu and Yajnavalkya</p>
11	SANSKT – 201	ELEMENTS OF DARSANAS –II	2017	<p>After completion of the course students are able to –</p> <p>I. Understand the knowledge of upamana and sabda pramanas</p> <p>II. Get the knowledge of Ayatharthanu Bhava</p> <p>III. Understand the Bahavana</p> <p>IV. Understand the Principals of Sankhya</p>
12	SANSKT – 202	VEDIC TEXTS –II	2017	<p>Students will know-</p> <p>I. The importance of Suktas</p> <p>II. The definition and purpose of Nirukta</p> <p>III. The meaning of Vedic words</p>
13	SANSKT – 203	PROSE AND POETRY - II	2017	<p>Students will able to get</p> <p>I. The beautification of prose literature.</p> <p>II. Enhancement of knowledge in appreciation of classical poetry</p> <p>III. Understanding about text that are selected.</p> <p>IV. Teaching skills in prose and poetry.</p>
14	SANSKT – 204	DRAMA ALANKARA AND PROSODY – II	2017	<p>Students will know</p> <p>I. The different characteristic features in Dramas</p>

				<p>II.The importance of nature and hermitages</p> <p>III.The features of Alankara and Classification of Alankaras</p> <p>IV.The knowledge of prosody</p>
15	SANSKT – 205 (A)	HISTORY OF SANSKRIT LITERATURE –II	2017	<p>After the completion of the course students are able to</p> <p>I.Know the features of Mahakavyas</p> <p>II.Know the structure of Drama and social message</p> <p>III.Know the moral values through the tales</p> <p>IV.Get the glance of classical Sanskrit literature</p>
16	SANSKT – 205 (B)	DRAMA AND POETRY - II	2017	<p>I.Get knowledge of good</p> <p>II.Know the character of Hero and Hero in etc., in the Drama</p> <p>III.Know the changes stories between original and creativeness</p> <p>IV.Know the importance skill fullness in poetry of Kalaidasa</p>
17	SANSKT – 205 (C)	ALANKARA AND PROSODY - II	2017	<p>I.Know the features and Examples</p> <p>II.Understand the different types of Uktis in Alankaras</p> <p>III.Know the difference between stuti and Ninda Alankaras</p> <p>IV.Get knowledge of sikharini and Mandakranta vrittas</p> <p>V.Know the definition and importance of Gayatri Matras</p>
18	SANSKT -	COMPARATIVE	2017	After complication of the course students are able to –

	206 (A)	PHILOLOGY AND SIDDHANTA KAUMUDI – II		I.Find out the main causes of semantic change II.Know the classification of suffixes the theories on the origin of suffixes III.Learn the morphological classification of verbs IV.Know the structure of vibhaktis and roots system and develops their writing Skills without grammatical mistakes
19	5 (B)	KAVYALANKARA SUTRA VRITTI - II	2017	I.Know the difference between Guna and Alankara II.Ability to understand the theory of Riti III.To enable to understand the usage of Sabdalankaras IV.Know the contribution of Vamana to alankara sastra
20	SANSKT - 207	HUMAN VALUES AND PROFESSIONAL ETHICS - II	2017	I.Understand the relevance of value based education in modern society II.Understand the old traditions of medical ethics III.Understand the solutions of illegal and unethical practice IV.Understand the man and nature, Natural calamities and get the solution regarding those situations.
21	SANSKT :301	(Sahitya) RASAGANGADHARA, (ANANA.I) – I (IE)	2017	After the completion of the course students are able to I. Understand the Rasaswarupa II.Understand the purpose of Kavya and different types of Kavya III.Know the interpretations of Rasa sutras and ten types of Gunas IV.Know the Abhasas
22	SANSKT :302	DHVANYALOKA - 1	2017	on completion of the course students are able to I.Understand the Dhvani swarupam

				<p>II. Understand the opinion of Dhvanyabhavavadins</p> <p>III. Know the Dhavanikavya Lakshana</p> <p>IV. Know the Vyangya as Kavyatma</p> <p>V. Get the knowledge of splendid sastra Dhvanyaloka</p>
23	SANSKT :303-A	KAVYAPRAKASA AND DASARUPAKA- 1(IE)	2017	<p>Students will get -</p> <p>I. The knowledge of definition of kavya, types of kavyas</p> <p>II. The Knowledge about verities of vyangya</p> <p>III. The Knowledge of vyanjanaswarupa</p> <p>IV. An idea of ten types of Rupakas</p>
24	SANSKT:30 3-B	HISTORY OF SANSKRIT POETICS AND SANSKRIT ESSAY-I	2017	<p>On completion of the course students are able to</p> <p>I. Get the knowledge of sentence formation to write the essays on different issues</p> <p>II. Acquire the knowledge of Alankarikas</p> <p>III. Understand the different theories in Alankara sastra.</p> <p>IV. Understand the theory of Alankara and Rithi.</p>
25	SANSKT:30 3-C	Natyastraam Chapter I & VI only	2017	
26	SANSKT:30 3-D	Bhojaraja's Champu Ramayana	2017	

		(Balakanda only)		
27	SANSKT:30 4	Personality Development in Pancatantra (Mitrabheda and Mitrapraptikam only)	2017	.I.Know the losses arriving out of Non friend ship II.Know the world knowledge III.Achieving personality development through Panchatantra
28	SANSKT:30 5-A	Introduction of Sanskrit languag Infant Reader complete	2017	
29	SANSKT:30 5-B	Raghuvamsam (Ist canto only)	2017	on completion of the course students are able to I.Understand the greatness of Sanskrit Language II.Know the greatness of poetry III.Get knowledge on panchamahakavya's after the epic literature IV.Get the knowledge about the kalidasas Natural and beautiful creations V.Understand the uses of upamalankara by kalidasa
30	SANSKT:40 1	(SAHITYA) RASAGANGADHARA (ANANA-I)	2017	After completion of the course students are able to I.Know the number of Rasas in kavyas II.Know the uses of Rasa to elevate the situations in kavya III.Acquire the knowledge of Gunas and their role in Kavyas IV.Understand the differentiation of Bhava in Alankara sastra.

31	SANSKT :402	DHVANYALOKA –II	2017	Students will be able to get- I.The knowledge about different forms of schools II.Knowledge about the classification of Dhvani Siddhanta III.Knowledge regarding different alankara dhvanis IV.Know the difference between Rasadhvani and Rasavadalankara V.Know the main Rasa in Ramayana and Mahabharatha
32	SANSKT:40 3(A)	KAVYAPRAKASA AND DASARUPAKA– II	2017	After the completion of the course students are able to – I.Understand the structure of the Kavya II.Get the knowledge of Rasa and it's Bhedas III.Find out the classification of Dhvani IV.Understand the Lakshana of Nataka V.Get the knowledge about 10 types of Nataka Bhedas
33	SANSKT:40 3(B)	HISTORY OF SANSKRIT POETICS AND SANSKRIT ESSAY-II	2017	After the completion of the course students are able to – I.Get the knowledge of writing skills II.Acquire the knowledge of several Aesthetic poets like Mammata, Ruyyaka III.Understand the main theories on kavya of different poets IV.Get the knowledge of presentation skills on social related issues

34	SANSKT :403(C)	Kavyadarsa Chapter – I	2017	
35.	SANSKT :403(D)	KavyaMeemamsa first to Eight Adhyayas	2017	
36.	SANSKT :404	Introduction to Epigraphy and Manuscriptology	2017	After the completion of the course students are able to I.Get the knowledge of inscriptions II.Acquire the knowledge of Brahmi and kharoshthi scripts III.Get the knowledge of writing materials in Ancient India IV.Get the knowledge of edition and critical edition of Manuscripts
37.	SANSKT :405 (A)	Hithopadesa of Narayanapandita Mitrabha and Mitrabheda	2017	Students will be able to I.Get the moral values II.Understand the mentality of different kinds of people in the society III.Acquire the knowledge to behave a good citizen and a well human being IV.Understand the message through neetikavya
38.	SANSKT :405(B)	Kautilya'sArthasastra Chapter – I (Vinayadhikarikam)	2017	

18.Sociology

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcome
1	MASO-101	Classical Sociological Theories	2017	<ol style="list-style-type: none"> 1. This paper seeks to expose the students to the classical thinkers and their contribution in building theoretical sociology. 2. To Compare and contrast the basic theoretical perspectives of sociology 3. To acquaint students with recent trends in Sociological thought.
2	MASO -102	Sociological Research Methods and Statistics	2017	<ol style="list-style-type: none"> 1. This course aims to enable the students to understand the fundamental nature of the scientific approach towards social research and apply the skills in undertaking social research. 2. To equip the students with strategies of development for different segments of society. 3. To provide ways and means of understanding and studying social reality
3	MASO -103	Indian Society and Inclusive Growth	2017	<ol style="list-style-type: none"> 1. This paper presents a comprehensive and integrated profile 2. To gain a better understanding of past and present structure and continuity of society

				3. Identify and analyze the problems in Indian society and suggest solutions from sociological perspective
4	MASO -104	Participatory Research	2017	<ol style="list-style-type: none"> 1. This paper is to inspire students to undertake research in partnership with stakeholders 2. To explain the emancipatory and empowering, collaborative and reflective approaches 3. To discuss the relationship between PRA and scientific method to incorporate the results to change the practice and policy.
5	MASO -105	Principles of Sociology	2017	<ol style="list-style-type: none"> 1. This paper gives the students an understanding of the basic principles of Sociology as an academic discipline 2. To analyze the ways in which people interact and function in groups 3. It provides a basic knowledge on the fundamental aspects of the important social institutions
6.	MASO -106	Human values and Professional Ethics - 1	2017	<ol style="list-style-type: none"> 1. To help students distinguish between values, skills, and understand the need, basic guidelines, content and process of value education 2. To provide Human Values and Ethics relating to Religion, Business, Law, Media and Environment

				3. To provide an in depth knowledge about the Moral and ethical values for interpretation in their day to day life
7.	MASO -201	Applied Sociology	2017	<ol style="list-style-type: none"> 1. To help students develop clear understanding of key concepts in classical and contemporary sociology and how these concepts relate to some of the perennial themes in the discipline 2. To develop an appreciation of the link between sociological theory and practice 3. To help students master the art of explaining abstract material in clear, precise ways that can be easily understood even by a lay man
8.	MASO -202	Social Demography	2017	<ol style="list-style-type: none"> 1. To introduce the significance of population and its relation to society 2. To provide a theoretical knowledge of the basic concepts of population and changes 3. To enable the students to realize impact of population , changing global scenario, awareness on population control devices and analyse prospects
9.	MASO -203	Rural Sociology and Development	2017	<ol style="list-style-type: none"> 1. This course is to help the students to understand the difference between urban and rural development 2. To analyse the dynamics of rural Indian society in the context of its socio, political and economic contradictions

				3. To evaluate the problems related to development in relation to the needs and aspirations of the marginalized sections
10.	MASO -204	Extension Work	2017	<ol style="list-style-type: none"> 1. This paper expose the students to apply sociological theories and principles in field areas 2. To give direct experience of social institutions and social problems through field work 3. To train for creative and innovative experiences in social field using research techniques
11	MASO -205	Environmental Sociology	2017	<ol style="list-style-type: none"> 1. This paper aims to provide the students with a comprehensive conceptual, theoretical and empirical backgrounds of interaction between Social world and Nature 2. To explore the relationship between human society and the larger natural environment 3. To prepare the students for further research in broad areas of environment and natural resource governance from sociological perspective
12	MASO -206	Human Values and Professional Ethics-II	2017	<ol style="list-style-type: none"> 1. To provide knowledge about Value oriented education, Medical ethics, Family values , Ethics and Moral code 2. To provide the Business, Environmental and social ethics followed and practiced 3. To enhance values of self-esteem and self-respect among students

13	MASO -301	Medical Sociology	2017	<ol style="list-style-type: none"> 1. This course will help the students to understand the concepts of health and illness 2. To understand the social facts of health and the root causes of illness 3. To apply sociological theories, concepts, and research to experiences of health, illness, health education, public health and the intense public issues related to health
14	MASO -302	Urban Sociology and Development	2017	<ol style="list-style-type: none"> 1. This paper attempts to analyse the urban social world and its dynamics, various theoretical constructs concerning the patterning and growth of towns and cities 2. To understand the various theoretical approaches to urban development and apply them to different aspects of cities 3. To study historical, economic, and political trends that have affected the growth and development of cities
15	MASO -303	Field Work and Extension (Village placement)	2017	<ol style="list-style-type: none"> 1. This paper aims at direct exposure of students to the real world and problems confronting society 2. Students will carry out field work in village for 10 days for practical experience 3. To learn about sociological study techniques like Participatory Rural Appraisal, Sampling, Interview and Extension
16	MASO 304	Generic electives (a) Human Rights	2017	<ol style="list-style-type: none"> 1. To study Human rights and Constitutional framework 2. To recognize the role of human rights in development,

				<p>theories of development, development and tradeoff on human rights</p> <p>3. To Understand the social, political, cultural, and comparative construction of human rights history , institutions, discourses, and futures</p>
		(b) Sociology of Gender	2017	<p>1. To examine how society influences understandings and perception of differences between masculinity (what society deems appropriate behaviour for a “man”) and femininity (what society deems appropriate behaviour for a “woman”).</p> <p>2. To understand influences of gender on identity and social practices.</p> <p>3. To pay special focus on the power relationships that follow from the established genderorder in a given society and changes over time.</p>
		c) Gerontology	2017	<p>1. This paper aims at understanding physical, psychosocial, and cultural aspects of the aged</p> <p>2. To understand aging transitions and intergenerational issues at various contexts and its nexus</p> <p>3. To examine health and illness adjusting to loss and care of persons with chronic illnesses and rehabilitative needs</p>
		(d) Sociology of Andhra	2017	<p>1. This paper aims to study the historical outline and emergence</p>

		Pradesh		<p>of Andhra society</p> <p>2. To understand the culture and various social movements in Andhra Pradesh</p> <p>3. To analyze the welfare and developmental programmes of the rural and urban Andhra Pradesh</p>
17	MASO -305	Open elective (a) Social Psychology and Personality Development	2017	<p>1. This paper aims at the understanding the relationship of cognition and attitudes of individual and society</p> <p>2. To focus on psychological aspects of the individual in the context of social behaviour</p> <p>3. To examine group dynamics such as group thinking and decision making, leadership, persuasion, conflict and cooperation)</p>
		(b) Business And Society	2017	<p>1. This paper aims at understanding the concepts of Social economy and knowledge management</p> <p>2. To examine the business community and social responsibility</p> <p>3. To understand the inter-relation among business firms, organizations , public policy, business law and governance</p>
23	MASO -401	Criminology	2017	<p>1. This paper seeks to describe the students about the different types of crime and scope of criminology</p> <p>2. To illustrate the causes of crime and crime rates</p> <p>3. To study the crime scientifically through data on crime, trends and various theoretical approaches</p>

24	MASO-402	Industrial Dynamics	2017	<ol style="list-style-type: none"> 1. This paper aims to provide the students about the structure and process of industrial organizations from sociological perspective 2. To deal with the effects of industrialization on Indian social systems and institutions 3. To study the internal relations which are connected directly or indirectly with industry
25	MASO-403	Field Work	2017	<ol style="list-style-type: none"> 1. This paper aims at exposing students in analysing the data 2. To understand the different variations in viva-voce 3. To understand the recent patterns in Practice
26	MASO-404	Generic electives (a) Social Welfare and Welfare Administration	2017	<ol style="list-style-type: none"> 1. This paper aims at understanding the efficiency of resources and services to meet the needs of the individuals, families, groups and communities 2. To understand the problems of Schedule castes, Schedule tribes, Backward classes and Minorities 3. To facilitate social relationship and adjustments necessary for the disadvantaged sections, children, women, youth and elderly
		(b) Social Entrepreneurship Development	2017	<ol style="list-style-type: none"> 1. The aim of this paper is to understand the theoretical positions of the Social entrepreneurship development 2. To be aware of the contemporary approaches to social entrepreneurship

				3. To have comprehensive understanding of the context, process and effects of entrepreneurial activities
		(c) Sociological Perspectives	2017	<ol style="list-style-type: none"> 1. This paper aims at the students to compare and contrast basic theoretical perspectives of sociology through rigorous scientific enterprise 2. To sensitize the need for empirically grounded theories 3. To acquaint students with the recent trends in Sociological thought
		(d) Globalization and society	2017	<ol style="list-style-type: none"> 1. This paper aims at the students to understand the nature and dynamics of globalization and social context through various agencies 2. To analyze the interconnected changes in the economic, cultural, social, and political spheres of society 3. To understand ever-increasing integration of nations, regions, communities
27	MASO-405	Open elective (a) Globalization and Educational Pursuits	2017	<ol style="list-style-type: none"> 1. This paper aims to understand multifaceted nature of globalization and internationalization in the context of higher education 2. To examine key concepts and theories of globalization, international and comparative education 3. To make the students understand the Global citizenship from professional and academic perspective

		(b) Visual Sociology	2017	<ol style="list-style-type: none"> 1. This paper aims at providing the students a new perspective in study of deliberate versus spontaneous behavior 2. To be aware of recording social signals, expressions as spontaneous as possible 3. To organize the recording of reactions and variations that occur as a response to the context
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19. Tamil

S.No	Course Code	Name of the Course	Year of introduction	Course outcome
	TML404 - D	General Elective – Folk Festivals		<p>Students will learn about various types of folk festivals and the way of their celebrations.</p> <p>2. Students will gain substantial knowledge about the nitty gritty of folk festivals of different religions</p>
	TML405-A:	Open Elective – Cilappathikaram (Madhurai kandam)		<p>Students will gain knowledge about the most prominent chapter of the First Epic in Tamil i.e. Maduraikantam</p> <p>2. Students will be motivated to study the first Epic in Tamil in its entirety</p>
	TML405-B: (12)	Open Elective – Panneru(TAMIZH)		Students will gain knowledge about the Tamil Alvars and their contribution to the Tamil literature

	Alvargal	VAINAVA ADIKAL		2. Students will be well equipped to understand the magnificent literary works of Tamil Alvars
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20.Urdu

S.No	Course Code	Name of the Course	Year of introduction	Course outcome
1.	URD 101	Mubadiyat-e- Lisaniyat aur Tareeq-e –Zaban-e- Urdu	2017	(1) Knowledge of history of basic Urdu Language. (2) Awareness about ancient and modern Indo-Aryan languages. (3) Command over origin and evolution of Urdu language.
2.	URD 102	Dakniyat	2017	(1) Student understands the brief history of Dakani Literature. (2) Student will be able to analyses the writings of Mohd Quli Qutub Shah. (3) Student will learn about the classical genres of Dakani literature.
3.	URD 103	Classiki Nasr	2017	(1) Student will be able to understand the early Urdu poetry of Northern India. (2) Understanding the different forms of Urdu Poetry and poets. (3) To knowledge about the distinctive features of Urdu poetry.

4.	URD 104	Arabi Zaban-o-Adab	2017	<p>(1) Knowledge about the tradition of humor and satire in Urdu literature.</p> <p>(2) Differentiate between satire and humor in text.</p> <p>(3) Analyze the text and identify the elements of satire and humor</p>
5.	URD 105	Fanne Sher aur Jadeed Asnafa Shairi	2017	<ul style="list-style-type: none"> • Apply the skills of Ilm e bayan and identifying the phrases in poetry. • Applying Ilm e Arooz skill in poetry. • Build an understanding about the modern genres of Urdu poetry

6.	URD 106	Human Values and Professional Ethics – I	2017	<ul style="list-style-type: none"> • Understand, What are the Human Values accepted globally. • Knowing the importance of Human Values in religious scriptures and philosophies. • Help to become a responsible Human being
7.	URD 201	Rayalaseema ka Sher-o-Adab	2017	<p>(1) Have learn about the important historical events of Urdu Poetry.</p> <p>(2) Have knowledge about the most important schools of thought of Urdu literature.</p>
8.	URD 202	Classiki Shairi	2017	<p>(1) Student understands the brief history of Dakani Literature.</p> <p>(2) Student will be able to analyze the writings of Mohd Quli Qutub Shah.</p> <p>(3) Student will learn about the classical genres of Dakani</p>
9.	URD 203	Hali : Hayat aur Adabi Khidmat	2017	<p>(1) Student will know about the classics of Urdu prose.</p> <p>(2) Student will be able to read and understand the text.</p> <p>(3) Student will learn critical awareness of the text.</p>

10.	URD 204	Farsi Zaban-o-Adab	2017	<ul style="list-style-type: none"> • Able to read, write and understand simple persian sentences • Knowledge about the Persian poetic writings of Sa'di, Hafiz and Iqbal
11.	URD 205	Ghair Afsanavi Adab	2017	<p>Understand the tradition of Ghari Afsanavi Adab and its salient features</p> <p>Literary importance of Maktoob Nigare and Inshaiya</p> <p>Literary importance of Khaka and Safarnama.</p>

12.	URD 206	Human Values and Professional Ethics –II	2017	<ul style="list-style-type: none"> • Awareness about Professional Ethics and its categorization • Understand the importance of Professional Ethics in society • Develop a feeling to become a responsible citizen and a good human being.
13.	URD 207		2017	<p>(1) Awareness about Professional Ethics and its categorization.</p> <p>(2) Understand the importance of Professional Ethics in society.</p> <p>(3) Develop a feeling to become a responsible citizen and a good human being.</p>
14.	URD 301	Jadeed Nasr	2017	<p>(1) Knowledge about the forms and tradition of Urdu Ghazal.</p> <p>(2) Understanding Dakani Ghazal with reference to eminent Dakani poets.</p> <p>(3) Understanding Classiki Ghazal and Jadeed Ghazal with reference to eminent poets in each category</p>

15.	URD 302	Jadeed Nazm	2017	<p>(1) Understanding the forms of Urdu Nazm.</p> <p>(2) Critically estimate and explain the art and technique of famous Urdu poets.</p> <p>(3) Knowledge about the distinctive features Urdu Nazm</p>
16.	URD 303	Urdu Tanqeed	2017	<ul style="list-style-type: none"> • Knowledge about Literary criticism. • Vies and contributions of Hali and Shibli on literary criticism • Understanding 6 schools of literary criticism.
17.	URD 304 A	(a) Sir Syed ka Khusoosi Mutale	2017	<ul style="list-style-type: none"> • Specialized in the contributions of Sir Syed Ahmed Khan. • Contributions of Sir Syed Ahmed Khan, as literary person and as a educationist. • Understanding the contributions of
	URD 304 B	b) Iqbal ka Khusoosi Mutalea		<ul style="list-style-type: none"> • To know about Sir Mohammed Iqbal in detail. • To know the biography of Sir Mohammed Iqbal and his literary contributions. • To put special focus on his poetry with reference to Bal-e-Jibrail

	URD 304 C	(c) Faiz ka Khusoosi Mutalea		<p>Specialized in the life and contributions of Faiz Ahmed Faiz</p> <p>Identify the uniqueness of the poetry of Faiz Ahmed Faiz.</p> <p>Understanding the salient features of the poetry of Faiz Ahmed Faiz</p>
	URD 304 D	d) Urdu Computer		<p>(1) The learner would understand about the history of computer.</p> <p>(2) The learner would understand the technical features of Urdu computer.</p>
	URD 305 A	a) Urdu Ghazal		<p>Knowledge about form and tradition of Urdu Ghazal</p> <p>Understanding Dakani Ghazal with reference to 2 Dakani poets</p> <p>Understanding Classiki Ghazal and Jadeed Ghazal with reference to 2 poets in each category</p>
	URD 305 B	b) Jadeed Dakani Shairi		<p>Knowledge about Jadeed Dakani Shairi.</p> <p>Understand Jadeed Dakani Shairi and its vocabulary and diction</p> <p>Critical awareness about 5 eminent poets of Jadeed Dakani</p>

18.	URD 305 C	(c) Urdu Afsana	2017	<p>Knowledge about tradition of Urdu Afsana</p> <p>Awareness of literary trends and its impact on Urdu Afsana</p> <p>Identifying and distinguishing the elements in Urdu Afsana</p>
19.	URD 401	Urdu Drama	2017	<p>(1) Knowledge of Basic Linguistics.</p> <p>(2) Awareness about ancient and modern Indo-Aryan languages.</p> <p>(3) Command over origin and evolution of Urdu language.</p>
20.	URD 402	Adabi Tehreekat aur Rujhanat	2017	<p>(1) Knowledge about research, types of research and method of research.</p> <p>(2) Distinguish between various types of research writings.</p> <p>(3) Capable for selection of topic, material collection, designing the research work and writing research paper.</p>
21.	URD 403	Tanz –o- Mizah	2017	<p>Knowledge about the tradition of humour and satire in urdu literature</p> <p>Differentiate between satire and humour in text</p> <p>Analyse the text and identify the elements of satire and humour.</p>

22.	URD 404 A	(a) Urdu Tarjuma Nigari	2017	<p>Knowledge about types, techniques and issues of translation</p> <p>Distinguish between various types of translations</p> <p>Understand the tradition of Urdu translation and literary translation</p>
23.	URD 404 B	(b) Urdu Marsiya		<p>Knowledge about the tradition of Urdu Marsiya.</p> <p>Compare and analyse the Marsiya of Anees and Dabeer</p> <p>Understand the salient features of Urdu Marsiya of Meer Anees and Mirza Dabeer</p>
24.	URD 404 C	(c) Urdu Khudnavisht		<p>Knowledge about the tradition of Urdu Khudnavisht</p> <p>Distinguish between biography and auto biography</p> <p>Understand critically the salient features of 2 urdu biographies : Yadon ki Baraat and Khwab Baqi Hain</p>
25.	URD 404 D	(d) Urdu Tarseel o Iblag ke Zaraye		<p>Knowledge about importance of Mass Media and its various forms.</p> <p>Distinguish between writings of news paper, radio and television</p>

26.	URD 405 A	(a) Ibtdayi Urdu	2017	<p>.. Reading and writing skills of urdu language</p> <p>Pursue further course in urdu language</p>
27.	URD 405 B	(b) Tehqeeq - Tariqekar	2017	<p>Knowledge about research, types of research and method of research</p> <p>Distinguish between various types of research writings</p> <p>Capable for selection of topic, material collection, designing the research work and writing research paper</p>
28.	URD 405 C	c) Urdu Qaseeda	2017	<p>Knowledge about the tradition of Urdu Qaseeda from Dakani period Differentiate between the Dakani and Urdu Qaseeda with respect of language, diction and style</p> <p>Understand the salient features of Urdu Qaseeda with special reference to Nusrati, Sauda and Zau</p>

S.V.U. College of Sciences

21. Anthropology

S. No.	Name of the Programme	Course Code	Title of the Course	Years	Course outcomes
1	M.Sc. Anthropology	ANO : 101	Introduction to Social Cultural Anthropology	2017	<ul style="list-style-type: none"> a. Exposed to the basic introductory background about Socio-cultural Anthropology, its historical background and relation to other branches b. Provides knowledge about the entire subject matter of the socio-cultural anthropology as well as its different sub-branches. c. Exposed to social institutions d. Know the religion beliefs, rituals and myth
2	M.Sc. Anthropology	ANO : 102	Introduction to Biological Anthropology	2017	<ul style="list-style-type: none"> a. Exposed to the basic concept, meaning and scope of Biological Anthropology b. Explain how human being acts as the central figure of Anthropology c. Elucidate the major divisions of

					<p>Biological/ physical Anthropology</p> <p>d. Know the inter-relationship between Biological Anthropology and other sciences</p> <p>e. To know how Man evolved in animal kingdom</p> <p>f. To understand how evolution has occurred and what are the evidences of evolution and addresses human variation and the causes of variations</p>
3	M.Sc. Anthropology	ANO-103	Introduction to Archaeological Anthropology	2017	<p>a. Able to define archaeological anthropology and its branches</p> <p>b. Understand the geological timescale, tool typology and technology</p> <p>c. The Course will explain the basic concepts and terminology used in prehistoric archaeology</p> <p>d. Understand chronological and cultural determinants of Indian and</p>

					European prehistory
4	M.Sc. Anthropology	ANO-104P	Somatometry & Somatoscopy	2017	<ul style="list-style-type: none"> a. Able to define archaeological anthropology and its branches b. Understand the geological timescale, tool typology and technology c. The Course will explain the basic concepts and terminology used in prehistoric archaeology
5	M.Sc. Anthropology	ANO 105p	Archaeological Anthropology	2017	
6.	M.Sc. Anthropology	ANO 106	Economic and Political Anthropology	2017	<ul style="list-style-type: none"> a. Able to learn meaning and scope of economic anthropology b. To understand the division of labor by gender and age, exchange of goods and gifts, and to understand the market economy. c. Able to know the historical background of Political Organization besides types and trends of Political Organization including types like i.e. Band, Tribe, Chiefdoms and State d. To know the local institutions:

					panchayats (traditional and statutory)
7.	M.Sc. Anthropology	ANO 107	Human Values and Professional Ethics -1	2017	
8.	M.Sc. Anthropology	ANO 201	Comparative Ethnography and Indian Anthropology	2017	<ul style="list-style-type: none"> a. To understand the major ethnological regions of the world b. To know the ethnic and linguistic classifications c. Able to understand the traditional Indian culture d. To know the contributions of Indian anthropologists
9.	M.Sc. Anthropology	ANO 202	Principals of Genetics	2017	<ul style="list-style-type: none"> a. understand about the scope of genetics and its historical development b. to learn the biology of cell and cell division c. Exposed to the patterns of the inheritance d. Know about blood groups and their anthropological perspective

10	M.Sc. Anthropology	ANO 203	Research Methods in Anthropology	2017	<ul style="list-style-type: none"> a. To understand the fieldwork traditions in Anthropology b. To understand the concept of research and its purpose c. highlight the conceptual structure of a research design d. understand the various statistical tools in the analysis and interpretation of the data
11	M.Sc. Anthropology	ANO 204P	Craniology and Craniometry	2017	
12	M.Sc. Anthropology	ANO205P	Doing Ethnography	2017	
13	M.Sc. Anthropology	ANO206	Prehistoric India	2017	<ul style="list-style-type: none"> a. learn the regional distribution of lower, middle, and upper Paleolithic cultures b. To learn the Mesolithic culture and typo- technology c. Learn the regional distributions of Neolithic cultures d. understand the copper and iron age e. exposed to the distribution of

					megaliths
14	M.Sc. Anthropology	ANO 207	Human Values and Professional Ethics -II	2017	
15	M.Sc. Anthropology	ANB 301	Human Evolution and Fossil Evidence	2017	<ul style="list-style-type: none"> a. Understand the evolutionary trends of primates, prosimianms to homosapiens b. To know the hominid evolution c. To know the Neanderthals distributions and extension d. Exposed to the homo sapiens distribution and feature of human species
16	M.Sc. Anthropology	ANB 302	Human Genetics	2017	<ul style="list-style-type: none"> a. understand the meaning and scope of human genetics b. know methods of studying human chromosomes and chromosomal abnormalities c. depict Inborn errors of metabolism with typical examples and human human ABO blood group system and

					<p>its fundamentals</p> <p>d. know the concept of “one-gene-one-enzyme hypothesis” which explains development of genetic diseases/disorders caused by defective genes controlling the functions of enzymes in metabolic pathways</p>
17	M.Sc. Anthropology	ANB 303P	Human Osteology and Osteometry	2017	
18	M.Sc. Anthropology	ANB 304P	Dermatoglyphics	2017	
19	M.Sc. Anthropology	ANB 305	Anthropological Demography	2017	<p>a. Know about the different population growth theories</p> <p>b. Learn the basic demographic variables</p> <p>c. Understand how the different factors regulates the population growth</p> <p>d. Understand the different demographic models</p> <p>e. Learn the genetic consequences of family planning</p>
20	M.Sc. Anthropology	ANB 306	Biostatistics and Computer	2017	a. To understand the concept of research

			Applications		<p>and its purpose</p> <p>b. To enlighten the process of research and conceptual structure of a research design</p> <p>c. Understand the disease outcomes through measurement of descriptive, analysis of variance and regression models through computer applications</p> <p>d. Know the use of computers in the analysis data and power point presentation</p>
21	M.Sc. Anthropology	ANB 307	Forensic Anthropology	2017	<p>a. able to know about forensic anthropology, a specialized, applied branch of physical/biological anthropology which deals with the crime investigation</p> <p>b. understand how dermatoglyphic, somatoscopic characteristics and body fluids helpful in crime investigation</p> <p>c. know the use of skeletal remains in</p>

					forensic investigations d. know the importance of modern methods in crime investigation
22	M.Sc. Anthropology	ANB 308	Palaeoanthropology	2017	a. understand the geological time scale and Pleistocene epoch b. know about tool making techniques and tool types c. gain knowledge about dating methods d. learn about Paleolithic, Mesolithic and Neolithic cultures in India
23	M.Sc. Anthropology	ANB 401	Biological Anthropology	2017	a. Understand the basic concept, meaning and scope of Biological Anthropology b. Know the biological variation in modern human populations c. Understand the human adaptability and impact of urbanization on humans d. Bio-cultural aspects of health and disease

24	M.Sc. Anthropology	ANB-402	Human Population Genetics	2017	<p>Students will</p> <ol style="list-style-type: none"> a. Explain the basic terms/concepts of human population genetics b. Appreciate the mechanisms of evolutionary forces in shaping biological diversity c. Understand the importance of Hardy – Weinberg Equilibrium especially the gene frequency changes with respect to Mutation, Genetic drift, Selection, Gene flow and to investigate them in empirical situations in human populations d. Know about breeding isolation and its implications in human population genetics. e. Understand various mating patterns (inbreeding and types of consanguineous marriages) and measure the inbreeding in families
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25	M.Sc. Anthropology	ANB-403P	Advanced Biological Anthropology	2017	
26	M.Sc. Anthropology	ANB 404 P	Fieldwork, Dissertation & Viva-Voce	2017	
27	M.Sc. Anthropology	ANB -405	Human Growth, Physique and Nutrition	2017	<ul style="list-style-type: none"> a. Know about the Differentiate the term growth, maturation and development b. To learn the methods of studying growth and the factors affecting the growth c. To understand the Human Physique and its Relation of Function, Disease and Behavior. d. Know the socio-cultural aspects of nutrition and nutrients in health and diseases
28	M.Sc. Anthropology	ANB 406	Applied Biological Anthropology	2017	<ul style="list-style-type: none"> a. Know about various applications of anthropometry and kinanthropometry in various fields b. Understand about the importance of forensic anthropology in crime investigations

					<ul style="list-style-type: none"> c. Know the importance genetic counseling, genetic screening, Genetic engineering, treatment of genetic diseases and Gene therapy d. Learn about the human geno project
29	M.Sc. Anthropology	ANB 407	Medical Genetics	2017	<ul style="list-style-type: none"> a. Understand the overplanting areas of anthropology and genetics, anthropology and medicine (Disease) b. Understand the different methods of identification genetic diseases c. Know about epidemiology, socio cultural and ecological dimensions of genetic diseases control and treatment d. Learn the knowledge, attitude and currying practices of genetic diseases
30	M.Sc. Anthropology	ANB-408	Epidemiology	2017	<ul style="list-style-type: none"> a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of

					<p>public health.</p> <p>b. Understand the global burden of health outcomes and diseases by assessing measures and interpret the prevalence, risk, rate, and odds within the context of epidemiology</p> <p>c. Know about Complications of obesity on health its prevention and control</p> <p>d. Understand the complex web of biological, behavioral, cultural and environmental factors towards the prevalence of communicable infections and chronic infections</p>
31	M.Sc. Anthropology	ANB -409	Fundamentals of Anthropology	2017	<p>a. Understand the meaning, scope and relation with other branches of Biological Anthropology.</p> <p>b. Understand the meaning, scope and relation with other branches of Socio-Cultural Anthropology.</p> <p>c. Understand the meaning, scope and relation with other branches of</p>

					Archeological Anthropology d. Exposed to race, ethnicity and racial classification
32	M.Sc. Anthropology	ANS 301	Theories of Culture	2017	<p>a. Understand the Conceptual Contributions of E. B. Tylor, B. Malinowski, A. L. Kroeber, L. White, Unilineal Evolution (L. H. Morgan and E. B. Tylor); Multilineal Evolution (J. Steward); Universal Evolution (L. White)</p> <p>b. To know the British School; German-Austrian School; American – Distribution School of culture</p> <p>c. Know the Patterns of Culture (R. Benedict); Basic Personality, Model Personality (Kardiner, Linton, Cora Dubois); Selfhood (Murphy); Symbolic (G. Obeyesekere)</p> <p>d. understand the historical approaches of culture</p>

33	M.Sc. Anthropology	ANS 302	Social Anthropology of Complex Societies	2017	<ul style="list-style-type: none"> a. Learn the meaning and approach of great and little traditions b. learn about the peasant societies and contemporary peasant societies c. know the culture of poverty, institution and complex societies d. understand problems of urbanization and social changes
34	M.Sc. Anthropology	ANS 303P	Participatory of Research methods in Development Process	2017	
35	M.Sc. Anthropology	ANS 304P	Non-Governmental Organizations and Extension studies	2017	
36	M.Sc. Anthropology	ANS 305	Ecological Anthropology	2017	<ul style="list-style-type: none"> a. Understand the environment and ecosystem in understanding the cultural modifications b. Know about the cultural ecology, cognitive ecology, single unified ecology, and ethno ecology. c. Learn issues and prospects on development projects and displacement

					d. Understand Biodiversity for sustainable development Knowabout Ecological protest movements (Chipko and Narmada Bachao Andolan (NBA));
37	M.Sc. Anthropology	ANS 306	Applied Anthropology- Indigenous Communities	2017	<p>a. Know the Similarities and Differences between Applied and Action Anthropology, Indigenous communities and applied anthropology. Indigenous rights.</p> <p>b. Know the process of acculturation and assimilation, socialization</p> <p>c. Know about applications of Anthropology in the management of health, agriculture, education and biodiversity and poverty eradication</p> <p>d. Gain the knowledge on tribal welfare, tribal problems, forest and property rights, shifting cultivation and tribal movements</p>
38	M.Sc. Anthropology	ANS 307	Anthropology of Religion Sacred	2017	a. Know about meaning and relation

			complexes in India		<p>with power and political leverages, ethnic identity and other aspects of culture in tradition and modern societies</p> <p>b. Know the different anthropological theories of religion</p> <p>c. Know the issues of right of food among by Hindus, five symbols of sikh identity, Aspects of sarora ritual and Shamansism, and Christianity in India</p> <p>d. To understand Contemporary issues of religious violence, secularism and fundamentalism</p>
39	M.Sc. Anthropology	ANS 308	Anthropology and Career Promotion	2017	<p>a. Understand the anthropology in competitive examinations</p> <p>b. Know about participatory research appraisal</p> <p>c. Exposed to the issues in tribes, tribal problems and cast populations</p> <p>d. Learn the books to be consulted,</p>

					review of questions and scheme of valuation
40	M.Sc. Anthropology	ANS 401	Structural Anthropology	2017	<ul style="list-style-type: none"> a. Know the social structure and function of culture b. Understand about the ideal and real social structure and social organization c. Know the general notion of structuralism d. Learn the symbols and structure
41	M.Sc. Anthropology	ANS-402	Medical Anthropology	2017	<ul style="list-style-type: none"> a. Exposed to the basic concepts in epidemiology with examples of epidemiology in different areas of public health. b. Understand the etiology, control of infections and non-infections diseases c. Understand the ethno-medicine in the management of health and illness behavior

					d. Understand the modern medical systems and health care delivery services
42	M.Sc. Anthropology	ANS-403P	Computer Applications	2017	
43	M.Sc. Anthropology	ANS 404 P	Fieldwork, Dissertation & Viva-Voce	2017	
44	M.Sc. Anthropology	ANS -405	Developmental Anthropology	2017	<p>a. Know about the Concept of Development and Sustainable Development</p> <p>b. Understand the steps in project preparation, goals, process of implementation and monitoring.</p> <p>c. Role of government, NGOs and peoples participation in development</p> <p>d. Know the watershed management and irrigation, resettlement,(Narmada) poverty Alleviation (Velugu); Primary Education (VECs</p>
45	M.Sc. Anthropology	ANS 406	Culture and Management	2017	a. Know the concept of organizational culture. Its links with cultural

					<p>anthropology Organizational ethnography. Anthropology of work</p> <p>b. Understand the Theories of organizational culture. Different anthropological traditions</p> <p>c. Know the How culture affect management Changes in management styles Future outlook.</p> <p>d. To understand the Ethno methodological approaches, Organizational symbolism. Integration, differentiation and fragmentation as three perspective approaches to organizational culture</p>
46	M.Sc. Anthropology	ANS 407	Anthropology of Displaced Populations	2017	<p>a. Know the peoples perception towards development and displacement</p> <p>b. Understand the role of government and non-government agencies in the process of displacement, resettlement and rehabilitation.</p> <p>c. Understand policy issues relating development and displacement in</p>

					<p>legal implications of displacement and rehabilitation</p> <p>d. Learn the Socio-Cultural effects of displacement, Socio disorganization, process of disintegration and reintegration</p>
47	M.Sc. Anthropology	ANS-408	Visual Anthropology	2017	<p>a. Know about the concept, scope and Historical Development of visual anthropology</p> <p>b. Know about the appraisal of ethnographic films in cultural context</p> <p>c. Knowledge about descriptive studying of Visual data produced by Cultures</p> <p>d. To understand the ethnographical films, still photos film shootings and commentary</p>
48	M.Sc. Anthropology	ANS -409	Tribal Studies	2017	<p>a. Understand the classification and distribution of tribes</p> <p>b. Know the tribal problems like Land</p>

					<p>Alienation, Indebtedness, Migration, and Cultural Degradation.</p> <p>c. To know the shifting cultivation, tribal education and tribal health</p> <p>d. To know the Fifth and Sixth Schedules Constitutional safeguards</p>
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22. Biochemistry:

S.No.	Course Code	Name of the Course	Year of introduction	Course outcomes
1	BCH101	Biochemical and Biophysical methods	2017	<ol style="list-style-type: none"> 1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research. 2. Learn about basic Radioactivity principles, measurement method and its biological applications. 3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields. 4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques

2	BCH 102	Molecular Physiology and community nutrition	2017	<ol style="list-style-type: none"> 1. Gain the knowledge about circulatory and excretory systems. 2. Know the importance of muscular and nervous system. 3. Health benefits and malnutrition of proteins and fats. 4. Know the importance of nutrition in maintenance of health and diseases.
3	BCH 103P	Practical related to Biochemical Preparations and Analysis	2017	<ol style="list-style-type: none"> 1. Learn safety and precautionary measures for working in a laboratory. 2. Develop skill and proficiency in preparation of laboratory reagents and Use of handling of glass wares, minor equipment for conducting experiments 3. Acquire practical training for qualitative and quantitative analysis of biological materials/molecules and their estimation using multiple methods. 4. Gain the knowledge about isolation studies of biological samples.
4	BCH 104P	Practical related to Analytical methods	2017	<ol style="list-style-type: none"> 1. Learn how to standardize various biomolecules. 2. Separate biomolecules by paper chromatography and thin layer chromatography 3. Demonstrate separation of protein by electrophoresis. 4. Isolation and spectrophotometric characterization of plant

				pigments.
5	BCH 105P	Human values and Professional ethics-I	2017	<ol style="list-style-type: none"> 1. Easily understand the Need and Importance of Professional Ethics- Goals- Ethical Values in various Professions. 2. Analyse the basic moral concepts- right , ought, duty, obligation, justice, responsibility and freedom. 3. Know about Purusharthas, Dharma, Artha, Kama, Moksha. 4. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavratas and anuvratas 5. Gain the knowledge about views on Manu and Yajnavalkya
6	BCH 106	Cell and Biomolecules	2017	<ol style="list-style-type: none"> 1. Easily understand the difference between prokaryotic and eukaryotic cells, and the concept of cell division. 2. Understand the classification, structure and biochemical reactions of aminoacids and proteins. 3. Describe the classification, structure and biochemical reactions of carbohydrates and lipids. 4. Understand the concept of structural organization of nucleic acids
7	BCH 201	Energy metabolism	2017	<ol style="list-style-type: none"> 1. Explain the broad outlines of intermediary metabolism and importance of carbohydrate metabolism in life. 2. Describe the importance of Electron transport and ATP production mechanism. 3. Gain in knowledge in Carbohydrate metabolism and their associated

				disorders. 4. Describe the details of lipid metabolism.
8	BCH 202	Metabolism of Nitrogen based molecules	2017	<ol style="list-style-type: none"> 1. Understand the anabolic and catabolic reactions of proteins and aminoacids. 2. Gain knowledge in the importance of aminoacids as biosynthetic precursors. 3. Know the biosynthesis and degradation of purine and pyrimidines and their associated disorders. 4. How toxic chemicals are metabolised by the body through detoxification and the mechanism of carcinogenicity.
9	BCH 203P	Practical related to Enzymology	2017	<ol style="list-style-type: none"> 1. Learn about estimation of various enzymes in biological sample. 2. Learn to perform assay of clinically important enzyme: serum acid and alkaline phosphatase, serum LDH. 3. Learn about the factors affecting enzyme activity and determination of K_m. 4. Demonstrate the Immobilization of enzymes.
10	BCH 204P	Practical related to Molecular	2017	<ol style="list-style-type: none"> 1. Isolate nucleic acids from various sources. 2. Estimate the nucleic acids quantitatively.

		Biology		<ol style="list-style-type: none"> 3. Determine the melting temperature. 4. Determine the purity of DNA by UV method.
11	BCH 205	Human values and Professional ethics-II	2017	<ol style="list-style-type: none"> 1. Easily understand the Components, Structure and responsibilities of family and status of women in family and society. 2. To get an idea on Ethical issues in relation to health care professionals and patients and genetic engineering, Social justice in health care, Human cloning. 3. To know about Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics. 4. Understand the Ethical theory, Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population. 5. Gain the knowledge about Organ trade, Human trafficking, Human rights violation and social disparities, Feminist ethics, Surrogacy/ pregnancy.
12	BCH 206	Enzymology	2017	<ol style="list-style-type: none"> 1. Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms. 2. Describe the concepts of enzyme inhibition and mechanism of enzyme catalysis.

				<p>3. Students will acquaint with mechanism of enzyme action and various coenzymes involved in the biochemical reactions taking place in living systems.</p> <p>4. Describe the concepts of co-operative behavior and allosteric regulation.</p>
13	BCH 301	Microbial Biochemistry and Genetics	2017	<p>1. Understand the basics of microbiology like nomenclature and classification of microorganisms, understand the various biological and non-biological method to control microorganisms</p> <p>2. The student will learn about different mode of nutrition in microorganisms and about viruses - Isolation, purification and characterization.</p> <p>3. Understand the basics of genetics and the gene arrangement in prokaryotes and eukaryotes.</p> <p>4. Gain knowledge in bacterial genetics includes the different types plasmids, recombination in bacteria, bacteriophages and bacterial defense mechanism(CRISPR) and Describe the various types of mutations and its effect.</p>
14	BCH 302	Molecular Biology	2017	<p>1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication.</p>

				<ol style="list-style-type: none"> 2. Learn about the mechanism and regulation of transcription in prokaryotes and eukaryotes. 3. Learn about genetic code and their evolution. 4. Gain knowledge in Different stages and components of protein synthesis.
15	BCH 303P	Practical related to Microbiology	2017	<ol style="list-style-type: none"> 1. Handle the microscope. 2. Learn Methods of sterilization and preparation of various culture media, Purification techniques. 3. Identification of isolated bacteria, and Growth curve of microorganism. 4. Learn Staining techniques for bacteria and yeast. 5. Gain knowledge in the Preparation of wine from Grapes. 6. Production and estimation of alcohols, citric acid, lactic acid etc.
16	BCH 304P	Practical related to Clinical Biochemical Analysis	2017	<ol style="list-style-type: none"> 1. Collect and maintain the biological samples for clinical assay. 2. Estimate the blood and serum enzymes for diagnosis of diseases. 3. Qualitatively analyse the abnormal constituents in urine. 4. Work with diagnostic kits
17	BCH 305 Generic Elective	a) Molecular Endocrinology b) Clinical	2017	<ol style="list-style-type: none"> 1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands. 2. Familiar with Iodine, Calcium metabolisms and disorders related to

	(Two papers out of three)	Biochemistry Cell and Developmental Biology		<p>thyroid and parathyroid glands.</p> <ol style="list-style-type: none"> 3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones. 4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones.
18	BCH 305 B	Clinical Biochemistry	2017	<ol style="list-style-type: none"> 1. Maintain clinical biochemistry laboratory, biological specimen collection for clinical assay and investigation of disorders associated with carbohydrates. 2. Learn and understand the Inborn errors of amino acid metabolism, Lipid metabolism and Renal function system. 3. Gain knowledge in clinical enzymology and Disorders of Gastrointestinal Tract. 4. Investigate the serum enzymes in liver
19	BCH-305c	Cell and Developmental Biology	2018	<ol style="list-style-type: none"> 1. Acquire knowledge on basic concepts of Developmental Biology. 2. Gain the proficient knowledge about zygote formation, blastula formation, gastrulation and many events in early development. 3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants. 4. Acquire knowledge about biomembrane concept and various membrane transport systems

20	BCH 306 Open Elective to others	a) General Biochemistry b)Environmental Biochemistry	2017	<ol style="list-style-type: none"> 1. Understand the classification, structure and biochemical reactions of aminoacidsand proteins. 2. Describe the classification, structure and biochemical reactions of carbohydrates and lipids. 3. Understand the concept of structural organization of nucleic acids. <ol style="list-style-type: none"> 1. Describe the Structure of porphyrins, Chemistry and functions of water and fat soluble vitamins. 2. Students will be able to know how to conserve natural resources for future. 3. Students will be able to describe differing types of <i>ecosystems</i> and their characteristic features. 4. Gain the knowledge about different types of pollution in the environment. 5. Know the Relation between human population and environment. <ol style="list-style-type: none"> 1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research. 2. Learn about basic Radioactivity principles, measurement method and its biological applications.
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		c)Experimental aspects related to analytical methods		<ol style="list-style-type: none"> 3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields. 4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques
21	BCH 401	Genetic Engineering	2017	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes, vector construction. 2. Understand the mechanisms of regulation of gene expression in different operons. 3. Know the techniques for transfer and expression of cloned gene and 4. Apply the knowledge of genetic engineering in biological research. 5. principle, Bioinstrumentation and applications of spectroscopy techniques.
22	BCH 402	Technical Writing, Biostatistics	2017	<ol style="list-style-type: none"> 1. Discuss the various steps involved in conducting research. 2. Learn to apply hypothesis testing via some of the statistical

		and Bioinformatics		distributions. 3. Develop understanding about biological data and database search tools. 4. Acquire hands on training on various computational tools and techniques employed in biological sequence analysis
23	BCH 403P	Practical related to Immunology and Hematology	2017	1. Collect the blood samples and handle the microscope. 2. Analyze the blood samples. 3. Expert in immunodiffusion and immunoelectrophoresis techniques
24	BCH 404P	Practical/Project work	2017	
25	BCH 405 Generic Elective	a) Immunology	2017	a. Gain knowledge on different types of antigens, antibodies and how different types of antibodies are produced. b. Out line, compare and contrast the key mechanism of innate and adaptive immunity. c. Gain knowledge on undesirable immunological reactions and their complication in health management. d. 4.Apply knowledge in disease diagnosis through serological tests. 1.Gain knowledge in Fermentation Technology and industrial production of chemicals.

		<p>b) Applied Biochemistry</p> <p>c) Plant Biochemistry</p>		<p>2. Learn Industrial application of Enzyme Technology.</p> <p>3. Gain knowledge in Applications of hybridoma technology.</p> <p>4. Understand the applications of genetic engineering in biotechnology and Genetically Modified Organisms.</p> <p>5. Understand the Structure, function and mechanisms of action of phytochromes, cryptochromes and phototropins;</p> <p>1. Gain knowledge in special features of secondary plant metabolism.</p> <p>2. Know the evolutionary studies Origin of basic biological molecules.</p> <p>3. Understand the Concepts of natural evolution and population genetics.</p>
26	<p>BCH 406</p> <p>Open Elective to others (For other department students)</p>	a) Research Methodology	2018	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Learn to apply hypothesis testing via some of the statistical distributions.</p> <p>3. Develop understanding about Biological data and database search tools.</p> <p>4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis</p> <p>1. Maintain clinical biochemistry laboratory, biological specimen collection for clinical assay and investigation of disorders associated with carbohydrates.</p>

		b) Biochemistry of diseases		<p>2 Learn and understand the Inborn errors of amino acid metabolism, Lipid metabolism and Renal function system.</p> <p>3 Gain knowledge in clinical enzymology and Disorders of Gastrointestinal Tract.</p> <p>4. Investigate the serum enzymes in liver diseases</p>
27		C) Nutritional Biochemistry	2018	<p>1. Determine the body composition and body weight by using various methods.</p> <p>2. To describe the importance of protein and fats.</p> <p>3. Gain knowledge on vitamins and minerals to maintain health.</p> <p>4. Acquire knowledge on nutritional importance in different ages in the life</p>

Immuno technology

S.No.	Course Code	Name of the Course	Year of introduction	Course outcomes
1	Core 1	Biochemical and Biophysical methods	2017	<p>1. Understand the principle, Instrumentation of different types of Light microscopy, electron microscopy, and techniques of Centrifugation and its applications in various fields of research.</p> <p>2. Learn about basic Radioactivity principles, measurement method and its biological applications.</p>

				<p>3. Acquire knowledge about the basics and latest developments in the instrumentation techniques of Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields.</p> <p>4. Demonstrate skill to explain about principle, Bioinstrumentation and applications of spectroscopy techniques</p>
2	Core 2	Molecular Physiology and community nutrition	2017	<p>5. Gain the knowledge about circulatory and excretory systems.</p> <p>6. Know the importance of muscular and nervous system.</p> <p>7. Health benefits and malnutrition of proteins and fats.</p> <p>8. Know the importance of nutrition in maintenance of health and diseases</p>
3	Core 3P	Practical related to Biochemical Preparations and Analysis	2017	<p>1. Learn safety and precautionary measures for working in a laboratory.</p> <p>2. Develop skill and proficiency in preparation of laboratory reagents and Use of handling of glass wares, minor equipment for conducting experiments</p> <p>3. Acquire practical training for qualitative and quantitative analysis of biological materials/molecules and their estimation using multiple methods.</p> <p>4. Gain the knowledge about isolation studies of biological samples.</p>

4	Core 4P	Practical related to Analytical methods	2017	<ol style="list-style-type: none"> 1. Learn how to standardize various biomolecules. 2. Separate biomolecules by paper chromatography and thin layer chromatography 3. Demonstrate separation of protein by electrophoresis. 4. 4. Isolation and spectrophotometric characterization of plant pigments
5	Compulsory Foundation	Cell and Biomolecules	2017	<ol style="list-style-type: none"> 6. Easily understand the difference between prokaryotic and eukaryotic cells, and the concept of cell division. 7. Understand the classification, structure and biochemical reactions of aminoacids and proteins. 8. Describe the classification, structure and biochemical reactions of carbohydrates and lipids. 9. Understand the concept of structural organization of nucleic acids.
6	Elective foundation	Human values and Professional ethics-I	2017	<ol style="list-style-type: none"> 10. Easily understand the Need and Importance of Professional Ethics- Goals- Ethical Values in various Professions. 11. Analyse the basic moral concepts- right , ought, duty, obligation, justice, responsibility and freedom.

				<p>12. Know about Purusharthas, Dharma, Artha, Kama, Moksha.</p> <p>13. Understand the Four Noble Truths- Arya astanga marga, Jainism- mahavratas and anuvratas.</p> <p>14. Gain the knowledge about views on Manu and Yajnavalkya.</p>
7	Core 1	Energy metabolism	2017	<p>Explain the broad outlines of intermediary metabolism and importance of carbohydrate metabolism in life.</p> <p>2. Describe the importance of Electron transport and ATP production mechanism.</p> <p>3. Gain in knowledge in Carbohydrate metabolism and their associated disorders.</p> <p>4. Describe the details of lipid metabolism.</p>
8	Core 2	Metabolism of Nitrogen based molecules	2017	<p>1. Understand the anabolic and catabolic reactions of proteins and aminoacids.</p> <p>2. Gain knowledge in the importance of aminoacids as biosynthetic precursors.</p> <p>3. Know the biosynthesis and degradation of purine and pyrimidines and their associated disorders.</p> <p>4. How toxic chemicals are metabolised by the body through</p>

				detoxification and the mechanism of carcinogenicity.
9	Core 3	Practical related to Enzymology	2017	<ol style="list-style-type: none"> 5. Learn about estimation of various enzymes in biological sample. 6. Learn to perform assay of clinically important enzyme: serum acid and alkaline phosphatase, serum LDH. 7. Learn about the factors affecting enzyme activity and determination of Km. 8. Demonstrate the Immobilization of enzymes
10	Core 4	Practical related to Molecular Biology	2017	<ol style="list-style-type: none"> 1. Isolate DNA from bacterial, plant and animal cells and RNA from yeast cells. 2. Estimate concentrations of DNA and RNA by conventional methods and UV absorption methods. 3. Determine the melting temperature(T_m) of DNA. 4. Learn procedures for isolation of phage M_{13} and single and double standard M_{13}DNA.
11	Compulsory Foundation	Enzymology	2017	<ol style="list-style-type: none"> 1. Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms. 2. Describe the concepts of enzyme inhibition and mechanism of enzyme catalysis. 3. Students will acquaint with mechanism of enzyme action and

				<p>various coenzymes involved in the biochemical reactions taking place in living systems.</p> <p>4. Describe the concepts of co-operative behaviour and allosteric regulation</p>
12	Elective foundation	Human values and Professional ethics-II	2017	<p>6. Easily understand the Components, Structure and responsibilities of family and status of women in family and society.</p> <p>7. To get an idea on Ethical issues in relation to health care professionals and patients and genetic engineering, Social justice in health care, Human cloning.</p> <p>8. To know about Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.</p> <p>9. Understand the Ethical theory, Ecological crisis, Pest control, Pollution and waste, Climate change, Energy and population.</p> <p>10. Gain the knowledge about Organ trade, Human trafficking, Human rights violation and social disparities, Feminist ethics, Surrogacy/ pregnancy</p>
13	Core 1	Microbial Biochemistry and Genetics	2017	<p>1. Understand the basics of microbiology like nomenclature and classification of microorganisms and different modes of nutrition in microorganisms.</p> <p>2. Learn and understand the various biological and non-</p>

				<p>biological methods to control microorganisms and Biology of subviral agents – Viroids, Prions, Satellite viruses.</p> <p>3. Understand the basics of genetics and the gene arrangement in prokaryotes and eukaryotes.</p> <p>4. Gain knowledge in bacterial genetics like different types plasmids, recombination in bacteria, bacteriophages and bacterial defense mechanism (CRISPR) and various types of mutations and their effects</p>
14	Core 2	Immunology	2017	<p>1. Gain knowledge on different types of antigens, antibodies and how different types of antibodies are produced.</p> <p>2. Out line, compare and contrast the key mechanism of innate and adaptive immunity</p> <p>3. Gain knowledge on undesirable immunological reactions and their complications in health management</p> <p>4. Apply knowledge in disease diagnosis through serological tests</p>
15	Core 3	Practical related to Microbiology	2017	<p>1. Handle the microscope.</p> <p>2. Learn Methods of sterilization and preparation of various culture media, Purification techniques.</p> <p>3. Identification of isolated bacteria, and Growth curve of microorganism.</p> <p>4. Learn staining techniques for bacteria and yeast.</p>

				<p>5. Gain knowledge in the Preparation of wine from Grapes.</p> <p>6. Production and estimation of alcohols, citric acid, lactic acid etc</p>
16	Core 4	Practical related to Immunology	2017	<p>1. Perform RBC, WBC count and differential count.</p> <p>2. Do all haematological tests that will be done in clinical labs.</p> <p>3. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc.</p> <p>4. Do Heme agglutination tests for identification of different antigens</p>
17	Generic Elective (Two papers out of three)	a) Molecular Biology	2017	<p>1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication.</p> <p>2. Learn about the mechanism and regulation of transcription in prokaryotes and eukaryotes.</p> <p>3. Learn about genetic code and their evolution.</p> <p>4. Gain knowledge in Different stages and components of protein synthesis</p>
		b)Molecular Endocrinology		<p>1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands.</p> <p>2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands.</p> <p>3. Know about the mechanism of action of insulin, glucagon and</p>

				<p>many gastro intestinal hormones.</p> <p>4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones.</p>
		c)Cell and Developmental Biology		<p>1. Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion, Apoptosis, Senescence, integrins .</p> <p>2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development.</p> <p>3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic plants.</p> <p>4. Gain knowledge about Miscelle, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis.</p>
18	Open Elective to others (Forother	a) Basics of Immunology	2017	<p>1. Gain knowledge on essential features of different types of antigens, antibodies.</p> <p>2. Out line, compare and contrast the key mechanism of innate and adaptive immunity.</p>

	department students)			<p>3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation.</p> <p>4. Apply knowledge in disease diagnosis through serological tests.</p>
		b) Immunotechniques		<p>1. To purify and analyse the antigens and antibodies.</p> <p>2. To apply different Hybridization techniques and ELISA, RIA.</p> <p>3. To detect various diseases by application of antiisera.</p> <p>4. To engineer antibodies and catalytic antibodies and produce drugs to allergies</p>
19	Core 1	Microbial Biochemistry and Genetics	2017	<p>1. Familiar with the tools and techniques for isolation and purification of genes, vector construction.</p> <p>2. Understand the mechanisms of regulation of gene expression in different operons.</p> <p>3. Know the techniques for transfer and expression of cloned gene and</p> <p>4. Apply the knowledge of genetic engineering in biological research</p>
20	Core 2	Immunology	2017	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Learn to apply hypothesis testing via some of the statistical distributions.</p>

				<p>3. Develop understanding about Biological data and database search tools.</p> <p>4.Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis</p>
21	Core 3	Practical related to Microbiology	2017	<p>1. Use diagnostic kits to test different types of auto immune diseases.</p> <p>2. Prepare Rabbit for performance of immunological studies.</p> <p>3. Perform Single Radial Immunodiffusion.</p> <p>4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc.</p> <p>5. Do Heme agglutination tests for identification of different antigens</p>
22	Core 4	Practical related to Immunology	2017	<p>1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures</p> <p>2. Learn structure, function of gene and its transfer methods</p> <p>3. Develop understanding on cause, spread and control of diseases caused by different microorganisms</p> <p>4. Get knowledge on collection of data, thesis writing.</p>
23	Generic Elective (Two papers	a) Molecular Biology	2017	<p>1. The students will learn about the Possible modes of replication, and roles of helicase, primase, gyrase, topoisomerase, DNA Polymerase, DNA ligase, and Regulation of replication.</p>

	out of three)			<p>2. Learn about the mechanism and regulation of transcription in prokaryotes and eukaryotes.</p> <p>3. Learn about genetic code and their evolution.</p> <p>4. Gain knowledge in Different stages and components of protein synthesis</p>
		b) Molecular Biology	2017	<p>1. Know about the mechanism of action of different hormones secreted by hypothalamus, pituitary and pineal glands.</p> <p>2. Familiar with Iodine, Calcium metabolisms and disorders related to thyroid and parathyroid glands.</p> <p>3. Know about the mechanism of action of insulin, glucagon and many gastro intestinal hormones.</p> <p>4. Acquire knowledge on Hormonal regulation of menstrual cycle and disorders associated with Gonadal hormones</p>
		c) Cell and Developmental Biology	2017	<p>1.Acquire knowledge on all cell organelles in prokaryotes and eukaryotes, cell signaling, cell communication, cell adhesion, Apoptosis, Senescence, integrins .</p> <p>2. Gain the proficient knowledge about basic concepts of Developmental Biology, zygote formation, blastula formation, gastrulation and many events in early development.</p> <p>3. Understand Organogenesis, limb development and regeneration in vertebrates, and post embryonic development in animals and Plant tissue culture, Protoplast fusion and Production of transgenic</p>

				plants. 4. Gain knowledge about Miscelle, and liposomes, Membrane fluidity, Active transport, Ionophores Gap junctions, Endocytosis and Exocytosis
24	Open Elective to others (For other department students)	c) Basics of Immunology Immunotechniques	2017	1. Gain knowledge on essential features of different types of antigens, antibodies. 2. Out line, compare and contrast the key mechanism of innate and adaptive immunity. 3. Gain knowledge on undesirable immunological reactions and their complications in health management and transplantation. 4. Apply knowledge in disease diagnosis through serological tests.
25	Open Elective (b)	<i>Immunotechniques and their Applications</i>	2017	1. To purify and analyse the antigens and antibodies. 2. To apply different Hybridization techniques and ELISA, RIA. 3. To detect various diseases by application of antiisera. 4. To engineer antibodies and catalytic antibodies and produce drugs to allergies.
26	Core 1	<i>Genetic Engineering</i>	2017	1. Familiar with the tools and techniques for isolation and purification of genes,

				<p>vector construction.</p> <p>2. Understand the mechanisms of regulation of gene expression in different operons.</p> <p>3. Know the techniques for transfer and expression of cloned gene and</p> <p>4. Apply the knowledge of genetic engineering in biological research</p>
27	Core 2	<i>Technical Writing, Biostatistics and Bioinformatics</i>	2017	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Learn to apply hypothesis testing via some of the statistical distributions.</p> <p>3. Develop understanding about Biological data and database search tools.</p> <p>4. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis.</p>
28	Core 3 P	<i>Practical related to Clinical Immunology, Biostatistics and Bioinformatics</i>	2017	<p>1. Use diagnostic kits to test different types of auto immune diseases.</p> <p>2. Prepare Rabbit for performance of immunological studies.</p> <p>3. Perform Single Radial Immunodiffusion.</p> <p>4. Have an idea on Rocket immunoelectrophoresis, Cross over Immunoelectrophoresis etc.</p> <p>5. Do Heme agglutination tests for identification of different</p>

				antigens
29	Core 4	<i>Project Work</i>	2017	<ol style="list-style-type: none"> 1. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures 2. Learn structure, function of gene and its transfer methods 3. Develop understanding on cause, spread and control of diseases caused by different microorganisms 4. Get knowledge on collection of data, thesis writing
30	Generic Elective (a)	<i>Clinical Immunology</i>	2017	<ol style="list-style-type: none"> 1. Understand different types of immunity and components of the Immune System. 2. Gain knowledge on auto immune diseases, Animal models used to study them and the treatment for them. 3. Familiar with Clinical manifestation of graft rejection, general immunosuppressive therapy and immune tolerance to allografts. 4. Acquire the knowledge on oncogenes, Psychoimmunology and neuroimmunomodulation
31	Generic Elective (b)	<i>Applied And Molecular Immunology</i>	2017	<ol style="list-style-type: none"> 1. Develop skill in production of monoclonal antibodies. 2. How better enzyme immobilization enhances its activity and their industrial and clinical applications. 3. Familiar with different types of vaccines and how they help in prevention of diseases. 4. Acquire the knowledge on IPR and procedures for patent filing
32	General	<i>Immunopharmacology</i>	2017	<ol style="list-style-type: none"> 1. Understand about drug receptors, pharmacodynamics,

	Elective (C)			<p>pharmacokinetics, drug biotransformation.</p> <p>2. Acquire knowledge on Immunomodulation therapy, malignancy therapy.</p> <p>3. Gain knowledge on Prostaglandins, thromboxanes, leukotrienes and inhibitors of these molecules formation.</p> <p>4. Familiar with Nitric oxide and its immunological effects.</p>
33	Open Elective a	<i>Research Methodology</i>	2017	<p>1. Discuss the various steps involved in conducting research.</p> <p>2. Acquire hands on training on various computational tools and techniques.</p> <p>3. Learn to apply hypothesis testing via some of the statistical distributions.</p> <p>4. To acquire knowledge on research proposals and motivate students towards research</p>
34	Open Elective (b)	<i>Immunological Diseases and Therapeutics</i>	2017	<p>1. Maintain the Clinical Immunology lab with all required standards.</p> <p>2. Outline, compare and contrast the key mechanism of innate and adaptive immunity.</p> <p>3. Gain knowledge on different types of immunodeficiencies, their treatment and about autoimmune disorders.</p> <p>4. Familiar with Clinical manifestation in graft acceptance or rejection and how immunosuppressive therapy is useful. And about cancer immunotherapy.</p>

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23. Botany

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcomes
	BOT-101	Algae, Bryophytes, Pteridophytes and Gymnosperms	2017	<ol style="list-style-type: none"> 1. The student able to distinguish different species of lower plant groups. 2. Cultivation methods of Algae for industrial production of Single Cell Proteins, Agar Agar ,carragin and Neutraceuticals.Discuss the importance of morphological structure, classification, reproduction and economic importance of Algae.
	BOT-102	Taxonomy of Angiosperms	2017	<ol style="list-style-type: none"> 1. Plant identification skills 2. Herbaria preparation and documentation.
	BOT-103	Microbiology	2017	<ol style="list-style-type: none"> 1. Isolation and identification of Pathogenic and Non-Pathogenic micro-organisms. 2. Methods of cultivation of economically/industrially important microorganisms. 3. Plant decease identification and control methods.
	BOT-104	Human Values and Professional Ethics - I	2017	<ol style="list-style-type: none"> 1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.

				<ol style="list-style-type: none"> 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
	BOT-105P	Practical-I Algae, Bryophytes, Pteridophytes and Gymnosperms & Taxonomy of Angiosperms	2017	<ol style="list-style-type: none"> 1. Identification of different Algal forms 2. Morphological description and use of Floral Keys for plant identification.
	BOT-106P	Practical-II Microbiology & Plant Development and Reproduction	2017	<ol style="list-style-type: none"> 1. Isolation, culture and staining methods for identification of micro-organisms. 3. Diagnosis of Plant deceases based on symptoms and control methods. 4. Histology of vegetative and reproductive structures and isolation
	BOT-201	Plant Ecology	2017	<ol style="list-style-type: none"> 1. Concepts of Ecology Students, relation between biotic and abiotic factors in an ecosystem. 2. Interaction between biotic communities and ecological energetics 3. Environmental pollution, Global warming and Environmental

				protection strategies and green energy production
	BOT-202	Plant Biochemistry and Metabolism	2017	<ol style="list-style-type: none"> 1. Biosynthesis of plant primary metabolites and chemistry. 2. Plant physiological processes water relation, plant nutrition and energy metabolism, 3. Metabolic changes in response to biotic and abiotic stress
	BOT-203	Plant Development and Reproduction	2017	<ol style="list-style-type: none"> 1. Wood formation and types 2. Reproductive structures. Mode of Reproduction
	BOT-204	Human Values and Professional Ethics - II	2017	<ol style="list-style-type: none"> 1. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. 2. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. 3. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.
	BOT-205P	Practical-I Plant Biochemistry and Metabolism &	2017	<ol style="list-style-type: none"> 1. Plant metabolite analysis and metabolic enzyme activity 2. Methods for Phytodiversity analysis.

		Phytobiodiversity and Conservation		
	BOT-206P	Practical-II Plant Ecology & Cell Biology, Genetics and Evolution	2017	<ol style="list-style-type: none"> 1. Plant communities 2. Methods for analysis of environmental pollutants 3. Designs of waste water treatment plants. 4. Assessment of effect of Global warming on Plant systems 5. Study of chromosomal morphology and behavior in Mitosis and Meiosis 6. Practical Problem solving on genetic concepts
	BOT-301	Molecular Biology And Techniques	2017	<ol style="list-style-type: none"> 1. Nucleic acids properties and mechanism of DNA replication and damage repair, and Chromatin organization and Cell Cycle regulation 2. Gene expression, processing of Transcripts and Proteins, and mechanisms of regulation of gene expression in Prokaryotes and Eukaryotes. 3. Principles of Microscopy, Nucleic acid and protein separation and identification techniques and methods
	BOT-302	Biodiversity and Conservation	2017	<ol style="list-style-type: none"> 1. Knowledge on Phytodiversity, biodiversity centres and types of Biodiversity. 2. Phytodiversity analysis using Remote sensing 3. Causes for the loss of phytodiversity and conservation strategies

	BOT-303 IE	Biosystematics	2017	<ol style="list-style-type: none"> 1. Biosystematic Categories, 2. Omega Taxonomy 3. Taximetrics and Concept of Species
	BOT-304IE	Molecular Plant Pathology	2017	<ol style="list-style-type: none"> 1. Symptoms based Diagnosis of Plant Diseases 2. Methods of Plant Disease Management and pest control
	BOT-306 IE	Computer Applications and Bioinformatics	2017	<ol style="list-style-type: none"> 1. Computer Operating systems and MS Office 2. The biological databases and Databases 3. Bioinformatics, tools and its applications.
	BOT-307 IE	Plants and Human Welfare	2017	<ol style="list-style-type: none"> 1. Food Yielding Plants as a source of food, fiber and timber. 2. Plants used in curing human diseases and other ailments in traditional medical systems and Veterinary diseases 3. Spices and condiments, Non timber forest products. 4. Preparation and application of Bio fertilizers, Bio pesticides, Bio insecticides, mushroom cultivation and plant based preservatives
	BOT-308 IE	Organic Farming and Mushroom Cultivation	2017	<ol style="list-style-type: none"> 1. Different types of compost preparation and their Nutritive value. 2. Biofertilizers and organic preparations, their marketing and farm management. 3. Vermicompost Technology 4. Identification of types of edible and poisonous mushrooms. 5. Method of cultivation of mushrooms and diseases management

	BOT-309 IE	Gardening and Nursery Techniques	2017	<ol style="list-style-type: none"> 1. Nurseries development and Management and Garden designing for different plant groups 2. <i>In vivo</i> and <i>in vitro</i> plant propagation methods 3. Plant nutrition and protection 4. Types of gardens and nurseries
	Practical-I	Molecular Biology And Techniques ; Biodiversity and Conservation	2017	<ol style="list-style-type: none"> 1.. Study of Chromosomal Behavior during Mitosis. 2. Isolation of DNA, RNA and proteins, Quantitative estimation 3. Assignments on DNA structure, Replication and Gene expression 4. Methods for Phytodiversity analysis. 5. Plant diversity conservation methods
	Practical-II	Biosystematics / Molecular Plant Pathology / Computer Applications and Bioinformatics	2017	<p>Biosystematics</p> <ol style="list-style-type: none"> 1. Isolation of Pathogenic Fungi and Bacteria. 2. Estimation of Rhizosphere, Phyllosphere, Spermosphere microorganisms by Serial dilution methods. 3. Screening of Botanical Pesticides (plant extracts) against Fungal Pathogens 4. Preparation of Plant Pathology Herbarium <p>Molecular Plant Pathology</p> <ol style="list-style-type: none"> 1. Isolation of Pathogenic Fungi and Bacteria. 2. Estimation of Rhizosphere, Phyllosphere, Spermosphere

				<p>microorganisms by Serial dilution methods.</p> <ol style="list-style-type: none"> 3. Screening of Botanical Pesticides (plant extracts) against Fungal Pathogens 4. Preparation of Plant Pathology Herbarium <p>Computer Applications and Bioinformatics</p> <ol style="list-style-type: none"> 1. Internet – E-mail and mail attachment Downloading 2. Webpage; Search engines; 3. Visit to DNA and Protein database; NCBI; EMBL, Swiss- Prot ;PDB 4. Use of similarity search tools: NBLAST; PBLAST 5. Use of literature database Virtual library; Agricola; PubMed
	BOT-401	Molecular Genetics & Genomics and Proteomics	2017	<ol style="list-style-type: none"> 1. Genetic basis of inheritance of genes and their mapping in eukaryotes and microbes 2. Molecular marker techniques and construction of genetic and physical maps. 3. Whole genome sequencing strategies, and structural and functional annotation. 4. Principles and methods of Transcriptome and Proteome analysis. 5. Mechanisms of evolution of genomes, New genes and proteins and construction of Phylogenetic trees.

				6. Structural organization of plant genomes, Arabidopsis and rice genomes and applications of genome projects.
	BOT-402	Plant Biotechnology	2017	<ol style="list-style-type: none"> 1. Techniques of Plant Tissue Culture and Applications. 2. Process of r-DNA technology 3. Production of genetically modified crops and Achievements
	BOT-403 IE	Molecular Plant Physiology	2017	<ol style="list-style-type: none"> 1. 1.Signal transduction pathways and Senescence 2. 2.Molecular mechanism of Photosynthesis 3. Synthesis and application of Nanomaterials. 4. Molecular Physiology of Stress and Flowering
	BOT-404 IE	Horticulture and Agricultural Biology	2017	<ol style="list-style-type: none"> 1. Propagation methods for horticultural crops 2. Soil science and fertility management for horticultural crops. 3. Seed production technology of horticultural crops.
	BOT-405 IE	Ethnobotany and Phytomedicine	2017	<ol style="list-style-type: none"> 1. Ethnobotanical knowledge 2. Medicinal plant Cultivation, Multiplication, Collection, Processing and Marketing 3. Sources of Plant Medicines, Formulations, Diagnostic features and their Biological activity.
	BOT-406 EE	Herbal Drugs and Cosmetics	2017	<ol style="list-style-type: none"> 1. Plants used by the Tribes for health care and applications of Ethno botany. 2. Identification of locally available Medicinal plants. 3. Methods of Collection, Processing and Storage of Plant

				<p>Medicines and trade</p> <p>4. Phytochemicals used in Herbal Cosmetic Preparations</p> <p>5. Formulation & standardization of various herbal cosmetic products</p>
	BOT-407 EE	Hydroponics	2017	<p>1. Scope, Future developments and applications of Hydroponics.</p> <p>2. Chemical and physical factors required for plant growth</p> <p>3. Nutrient Solutions and Media Plant sanitation and disease management</p> <p>4. Techniques in Hydroponics and Cultivation of crop plants</p>
	BOT-408 EE	Nano Biotechnology	2017	<p>1. Production of nano scale devices by different methods.</p> <p>2. Applications of nano devices in medicine and agriculture</p>
	BOT-409 EE	Plant Disease Management	2017	<p>1. Plant disease causing agents</p> <p>2. Specific diseases of Cereals, Pulses, Vegetables, Fruit Crops, Oil Yielding and Fibre yielding Plants.</p> <p>3. Plant Disease Management using Physical and Chemical and Bio-Control methods</p>
	Practical – I	Molecular Genetics & Genomics and Proteomics; Plant Biotechnology	2017	<p>1) Isolation of genomic DNA and RNA and Quantification by Spectrophotometry.</p> <p>2) Preparation of DNA denaturation curve</p> <p>3) Restriction digestion of DNA, Agarose Gel Electrophoresis</p>

				<ol style="list-style-type: none"> 4) PCR amplification of DNA. and RAPD analysis. 5) Precipitation of proteins ,Estimation of protein. 6) Determination of Isoelectric Point of proteins 7) Separation of proteins by SDS-PAGE and size determination 8) Problems related to genomics, proteomics and molecular evolution 9) Establishment of callus, organ and cell cultures
	Practical - II	<p>403 IE – Molecular Plant Physiology /</p> <p>404 IE – Horticulture and Agriculture Biology /</p> <p>405 IE – Ethanobotany and Phytomedicine</p>	2017	<p>BOT-403 IE : Molecular Plant Physiology</p> <ol style="list-style-type: none"> 1. Extraction and Estimation of Chlorophyll pigments. 2. Assay of enzyme activity 3. Estimation of Carbohydrate, proteins and separation 4. Seed viability and germination 5. Metabolite accumulation under stress <p>BOT-404 IE: Horticulture and Agriculture Biology</p> <ol style="list-style-type: none"> 1. Isolation, Characterization and Identification of Rhizobium 2. Outdoor cultivation of Blue green Algae 3. Vermicompost production 4. Multiplication of VAM and Preparation Biofertilizers; 5. Establishment of nursery, different containers, soil transplantation techniques. 6. Plant propagation – layering, cutting, grafting.

				<p>7.. Layout and Designing of gardens and Lawns.</p> <p>BOT-405 IE: Ethnobotany and Phytomedicine</p> <ol style="list-style-type: none"> 1. Recording medicinal practices and herbal formulations of tribal medicine by interviews and field study and preparation of report. 2. Development of medicinal plant nurseries in botanical garden. 3. Practical Methods of Cultivation, Propagation, Conservation and Protection of important Medicinal plants to develop familiarity. 4. Micro-propagation of Medicinal plants and Production of Callus from different Explants for Specific Biologically active Ingredients. 5. Practical demonstration of collection, processing and storage of Plant Medicines. 6. Demonstration of drug Formulation and Herbal cosmetics. 7. Organoleptic examination and physical and chemical properties.
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24. Biotechnology

S. No.	Name of the Programme	Course Code	Title of the Course	Years of Introduction	Course outcomes
1	M.Sc. Biotechnology	BTH-101	Structure and functions of Biomolecules	2017	<ol style="list-style-type: none"> 1. Understand the classification of carbohydrates and their biochemical functions. 2. Correlate the reactions of amino acids that are basis for identification tests and biochemical pathways. 3. Know the structure of different classes of lipids and their roles in biological systems. 4. Comprehend the structure and functions of nucleic acids
2	M.Sc. Biotechnology	BTH-102	Advanced tools and techniques	2017	<ol style="list-style-type: none"> 1. Learn about various techniques for isolation and concentration of macromolecules. They will also understand the principles and applications of different Microscopes 2. Understand the techniques of chromatography, centrifugation and electrophoresis 3. Achieve a basic understanding of characterization of biomolecules by different

					<p>Spectroscopic techniques</p> <p>4. They learn safety measures in handling radioisotopes and familiarize with the various radioisotope tracer techniques and their role in biology.</p>
3	M.Sc. Biotechnology	BTH-103P	Practical related to Analytical methods	2017	1. Acquire the skill to perform experiments related to advanced tools and techniques
4	M.Sc. Biotechnology	BTH-104P	Practical related to Biochemical Preparations and Analysis	2017	1. Acquire the skill to perform experiments related to Biochemical preparations
5	M.Sc. Biotechnology	BTH-105	Microbiology and Immunology	2017	<p>5. Acquire the knowledge on classification and structure of different microorganisms</p> <p>6. Understand the microbial techniques for isolation, cultivation and maintenance of pure cultures</p> <p>3. Out line, compare and contrast the key mechanism of innate and adaptive immunity</p> <p>4. Apply knowledge in disease diagnosis through serological tests</p>
6.	M.Sc. Biotechnology	BTH-106	Human values and Professional ethics-I	2017	Learn the importance of Human values and Professional ethics
7.	M.Sc. Biotechnology	BTH-201	Enzymes and Intermediary	2017	1. Gain knowledge on different enzymes and

			metabolism		<p>their significance</p> <p>2. Correlate how the living organisms exchange energy and matter with the surroundings for their survival, and store free energy in the form of energy-rich compounds</p> <p>3. Recognize how the catabolic breakdown of the substances is associated with release of free energy; whereas, free energy is utilized during synthesis of biomolecules i.e., anabolic pathways</p> <p>4. Apply the knowledge of metabolic pathways to biotechnological and biochemical research.</p>
8.	M.Sc. Biotechnology	BTH-202	Molecular Biology	2017	<p>1. Understand the biochemical composition and genome organization in living cells</p> <p>2. Learn about the mechanism of tissue specific transcription and role of RNA polymerases</p> <p>3. Appreciate the correlation of genetic code with protein synthesis in prokaryotic and eukaryotic cells.</p> <p>4. Gain insights of mechanism of gene expression and regulations</p>

9.	M.Sc. Biotechnology	BTH-203P	Practical related to Molecular Biology	2017	Learn the skill to perform experiments related to Molecular biology
10	M.Sc. Biotechnology	BTH-204P	Practical related to Enzymology	2017	Learn the skill to perform experiments related to Enzymology
11	M.Sc. Biotechnology	BTH-205	Technical writing, Biostatistics and Bioinformatics	2017	<ol style="list-style-type: none"> 4. Discuss the various steps involved in conducting research 5. Learn to apply hypothesis testing via some of the statistical distributions 6. Develop understanding about Biological data and database search tools 7. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis
12	M.Sc. Biotechnology	BTH-206	Human values and Professional ethics-II	2017	Learn the importance of Human values and Professional ethics
13	M.Sc. Biotechnology	BTH-301	Genetic Engineering	2017	<ol style="list-style-type: none"> 1. Familiar with the tools and techniques for isolation and purification of genes 2. Acquire knowledge on vectors for construction of genomic libraries and cDNA libraries 3. Understand the mechanism of cDNA

					<p>synthesis</p> <p>4. Know the techniques for transfer and expression of cloned gene and applications of genetic engineering in biological research.</p>
14	M.Sc. Biotechnology	BTH-302	Cell and Tissue culture	2017	Gain the knowledge regarding plant and animal cell cultures. Get the skill to perform micropropagation.
15	M.Sc. Biotechnology	BTH-303P	Practical related to Microbiology	2017	Obtain the skill to perform experiments related to Microbiology and Cell Biology
16	M.Sc. Biotechnology	BTH-304P	Practical related to Tissue culture	2017	<ol style="list-style-type: none"> 1. Learn important milestones in the plant tissue culture and understand the concepts and principles of Plant tissue culture. 2. Learn different pathways of plant regeneration under in vitro conditions – organogenesis, somatic embryogenesis, synthetic seeds and applications. 3. Understand techniques of establishing cell suspension culture, techniques of virus elimination by meristem and shoot tip culture. <p>Acquire skill of propagation of elite medicinal</p>

					and economically important plants and establish micropropagation unit for commercialization.
17	M.Sc. Biotechnology	BTH-305a	Bioprocess Engineering and Technology	2017	<ol style="list-style-type: none"> 1. Handle the axenic cultures of industrially important microbes and appreciate the relevance of microorganisms from industrial context. 2. Gain an overview on design, operations and types of fermentation systems 3. Calculate yield and production rates in a biological production process, and also interpret data 4. Apply knowledge on separation and purification of end products of fermentation
18	M.Sc. Biotechnology	BTH-305b	Legal, ethical and implications of Biotechnology	2017	<ol style="list-style-type: none"> 1. Develop awareness on types IPR and patenting process 2. Understand legal and ethical controversies in biotechnological innovations 3. Apply knowledge in providing safety of food, water and environment 4. Gain overview of GM crops and microbes and their impact on environment

19	M.Sc. Biotechnology	BTH-305c	Food and Industrial Biotechnology	2017	<ol style="list-style-type: none"> 1. Acquire knowledge on food preservation, processing and control measures for food poisoning 2. Establish indoor and outdoor cultivation units for algal cultivation 3. Learn effective management of solid waste for energy production. 4. Appreciate the industrial role of microorganisms in production of biomolecules
20	M.Sc. Biotechnology	BTH-306a	Plant tissue culture	2017	<ol style="list-style-type: none"> 1. Learn important milestones in the plant tissue culture and understand the concepts and principles of Plant tissue culture. 2. Learn different pathways of plant regeneration under in vitro conditions – organogenesis, somatic embryogenesis, synthetic seeds and applications. 3. Understand techniques of establishing cell suspension culture, techniques of virus elimination by meristem and shoot tip culture.

					4. Acquire skill of propagation of elite medicinal and economically important plants and establish micropropagation unit for commercialization
21	M.Sc. Biotechnology	BTH-306b	Bioethics	2017	<ol style="list-style-type: none"> 1. Acquire the knowledge on IPR and procedures for patent filing 2. Understand the Legal and Ethical aspects of gene therapy - cloning - Manipulation of human genome -Technology transfer. 3. Learn role of Government, Industries and society in promoting, accepting and regulating the rDNA research 4. Develop understanding on Environmental and Health aspects of Biotechnology
22	M.Sc. Biotechnology	BTH-306c	Bioinformatics	2017	<ol style="list-style-type: none"> 1. Develop understanding about Biological data and database search tools 2. Acquire hands on training on various computational tools and techniques employed in Biological sequence analysis 3. Learn about pathway and enzyme databases, Sequence submission tools <p>Develop understanding on protein folding and its</p>

					significance
23	M.Sc. Biotechnology	BTH-401	Environmental Biotechnology	2017	<ol style="list-style-type: none"> 1. Learn the relation between biotic and abiotic factors in different ecosystem models and predict how changes in free energy availability affect ecosystems. 2. Appreciate the role of microorganisms in biodegradation and pollution detection 3. Develop skill on large scale production and applications of bio pesticides and bio fertilizers fin agriculture 4. Apply knowledge on solid waste management and reclamation of waste water
24	M.Sc. Biotechnology	BTH-402	Plant Biotechnology	2017	<ol style="list-style-type: none"> 1. Develop skill in production of transgenic plants resistant to biotic and abiotic stress 2. Apply knowledge for industrial production of plant metabolites 3. Cultivate the micro and macro algae of commercial importance on large scale 4. Identify different plant pathogens and apply biological control methods

25	M.Sc. Biotechnology	BTH-403P	Practical related to Immunology	2017	1. Gain skill to perform immunology related experiments
26	M.Sc. Biotechnology	BTH-404	Project work	2017	1. Select the appropriate research design and develop appropriate research hypothesis for a research project and acquire hands on training on various tools and techniques employed in executing the project.
27	M.Sc. Biotechnology	BTH-405a	Pharmaceutical Biotechnology	2017	1. Gain knowledge on preparation and formulations of different drugs 2. Develop skill on commercial production of pharmaceutical products for human welfare 3. Learn the techniques of drug validation and vaccine production 4. Understand the bioethical principle, values, concepts and social and judicial implications of pharmaceutical biotechnology
28	M.Sc. Biotechnology	BTH-405b	Animal Biotechnology	2017	1. Understand the organization of reproductive organs and advances in contraception research 2. Learn the techniques of In Vitro Fertilization and artificial insemination 3. Develop skill in molecular techniques for

					<p>production of transgenic animals</p> <p>4. Apply knowledge on molecular farming for production of vaccines and hormones</p>
29	M.Sc. Biotechnology	BTH-405c	Applications of Biotechnology	2017	<p>1.Acquire the knowledge on applications of plant, animal and environmental biotechnology</p> <p>2.Develop skill on organic farming and preparation of bio pesticides and bio fertilizers</p> <p>3.Establish and maintain cell lines for vaccine production</p> <p>4.Apply knowledge on waste management and recycling for environmental protection</p>
30	M.Sc. Biotechnology	BTH-406a	Tools in Biotechnology	2017	<p>1. Acquire the knowledge on analysis of DNA replication to map site specific points of replication</p> <p>2. Learn to apply DNA microarrays to detect replication origins</p> <p>3. Understand the functions of helicase and polymerase in DNA replication</p> <p>4. Acquire knowledge on sophisticated programmed of genome replication</p>

31	M.Sc. Biotechnology	BTH-406b	Immunology	2017	<ol style="list-style-type: none"> 1. Out line, compare and contrast the key mechanism of innate and adaptive immunity 2. Apply knowledge in disease diagnosis through serological tests 3. Develop skill in production of monoclonal antibodies 4. Gain knowledge on undesirable immunological reactions and their complications in health management
32	M.Sc. Biotechnology	BTH-406c	Applications of Biotechnology	2017	<ol style="list-style-type: none"> 1.Acquire the knowledge on applications of plant, animal and environmental biotechnology 2.Develop skill on organic farming and preparation of bio pesticides and bio fertilizers 3.Establish and maintain cell lines for vaccine production 4.Apply knowledge on waste management and recycling for environmental protection <p>1.</p>

25. Chemistry

Analytical Chemistry

S.No.	Course Code	Title of the Course	Years of Introduction	Course outcomes
1.	CHE-101	Inorganic Chemistry I	2017	<ol style="list-style-type: none">1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes.2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules.3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.

2.	CHE-102	Organic Chemistry I	2017	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereo controlled reactions 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents. 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
3.	CHE-103	Physical Chemistry-I	2017	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics

				<ol style="list-style-type: none"> 2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories. 3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties. 4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification
4.	CHE-104	Inorganic Practical- I	2017	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations 2. To familiarize with techniques of titration and calculation of errors

5.	CHE-105	Organic Practical-I	2017	<ol style="list-style-type: none"> 1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups 2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules.
6.	CHE-106	Physical Practical I	2017	<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data
7.	CHE-107	General Chemistry-I	2017	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation. 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS.

8.	CHE-108	Human Values and Professional Ethics – I	2017	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts character and Conduct. 3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya 4. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics
9.	CHE - 201	Inorganic Chemistry II	2017	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and

				<p>Farady methods</p> <p>4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reaction</p>
10.	CHE-202	Organic Chemistry II	2017	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E₁, E₂ and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments. 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions. 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions. 4. To understand the structural elucidation and synthesis of alkaloids using specific

				reagents.
11.	CHE -203	Physical chemistry II	2017	<ol style="list-style-type: none"> 1. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems 2. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants. 3. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem. 4. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system
12.	CHE 204	Inorganic Chemistry	2017	<ol style="list-style-type: none"> 1. To separate and determine the two component mixtures. 2. To acquire knowledge in the preparation of

				metal complexes
13.	CHE 106	Core practical II: Organic Chemistry	2017	<ol style="list-style-type: none"> 1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the 2. To get knowledge about the chemical behavior of different components and mechanisms
14.	CHE 206	Core practical II: Physical Chemistry	2017	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsager equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry.
15.	CHE 207	General Chemistry II	2017	<ol style="list-style-type: none"> 1. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes 2. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC

16.	CHE 208	Human Values and professional ethics-II	2017	<ol style="list-style-type: none"> 1. To understand the concepts of human values, responsibilities of family values and status of women in family and society 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 4. To familiarize environmental ethics, ethical theory and ecological crisis
17.	CHE-AC-301	Inorganic Spectroscopy and Thermal Methods of Analysis	2017	<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry. 2. To gain knowledge on Doppler shift and

				<p>chemical shift, basic principles and applications of NQR spectroscopy</p> <ol style="list-style-type: none"> To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy
18.	CHE AC 303 & 304	Core-Practical: Classical Methods of Analysis	2017	<ol style="list-style-type: none"> To know the basic principles of instrumental methods of analysis To gain knowledge on chemistry of alloys To Understand the complexity, theory and working principle of colourimetry To familiarize with laws of colorimetric titrations
19.	CHE-AC-305A	Organic Chemistry III	2017	<ol style="list-style-type: none"> To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin

				<p>in the synthesis of a variety of complex molecules</p> <ol style="list-style-type: none"> To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.
20.	CHE-AC-305B	Physical Chemistry III	2017	<ol style="list-style-type: none"> To know the determination of Character Co-ordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle. To learn the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals To study the rigid rotator model, stark effect,

				<p>vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational-rotational Raman spectroscopy</p> <p>4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
21.	CHE AC 306	Spectral Techniques	2017	<p>1. To know the basic principles of spectroscopy.</p> <p>2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques.</p> <p>3. To Understand the applications of AAS.</p> <p>4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups</p>
22.	CHE AC 306	Chromatographic Techniques	2017	<p>1. To know the stationary and mobile phases in chromatographic techniques.</p> <p>2. To familiarize applications of different chromatographic methods.</p>

				<p>3. To Understand the principle of chromatographic techniques</p> <p>4. To gain knowledge on the normal phase and reverse phase.</p>
23.	CHE-AC-401	Quality Control and General Principles	2017	<p>1. To diagnose problems in the quality improvement process and Explain each total quality implementation phase</p> <p>2. To know about theoretical basis for the use of organic reagents in inorganic analysis.</p> <p>3. To understand different types of kinetic methods and their evaluation and to determine the kinetics of enzyme</p> <p>4. To understand the oxidation reactions with Ce (IV) sulphate solutions and applications of complexometric titrations</p>
24.	CHE-AC 402	: Instrumental Methods of Analysis	2017	<p>1. To understand the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF).</p> <p>2. To understand the basic principles,</p>

				<p>procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC).</p> <ol style="list-style-type: none"> To get knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis To improve the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I⁻ and S²⁻) by using I₂ liberations and Ce⁴⁺ liberation in solutions
25.	CHE AC 403	Core practical I: Analytical Chemistry- Practical	2017	<ol style="list-style-type: none"> Understand the common laboratory techniques including separation techniques Polarography, atomic absorption spectroscopy in both emission and absorption mode. Gain knowledge on implementation of gas chromatography and HPLC for separation

				<p>of mixtures</p> <p>4. Familiarize with interpretation of data to structures by NMR.</p>
26.	CHE AC 404	Project Work	2017	<ol style="list-style-type: none"> 1. Perform experiments, collection and evaluation of data 2. Interpretation of results while adhering to scientific principles of responsible and ethical behaviour 3. Analysing and compiling the data and results in a chronological order in the form of dissertation. 4. Preparation of dissertation
27.	CHE-AC-405	Applied and Environmental Aspects	2017	<ol style="list-style-type: none"> 1. Have an idea about preparation of sampling, decomposition, separation and preconcentration of metal ions etc. 2. Gain experience on agrochemicals and fertilizers and their analysis 3. Have an idea on the analysis of fuels, alloys and explosives 4. Experience with environmental pollution monitoring techniques

28.	CHE-AC-406	Bioinorganic, Bioorganic, Biophysical Chemistry	2017	<ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes. 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters
29.	CHE AC 406A	Drug Chemistry	2017	<ol style="list-style-type: none"> 1. Know about natural products 2. Know Interpretation of cardiovascular drugs 3. Know the Analyzing about prostaglandins. 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.
30.	CHE AC 406 B	Electroanalytical Techniques	2017	<ol style="list-style-type: none"> 1. Know how to interpret potentiometry and conductometry 2. Know the Interpretation of results while adhering to DC Polarography 3. Know the Analysing and compiling the data

				and results in polarography . 4. Familiarize Types of ion sensitive electrodes
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M.Sc., Environmental Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcomes
1.	CHE-101	Inorganic Chemistry- I	2017	<ol style="list-style-type: none"> 1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes. 2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules. 3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions

				4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.
	CHE-102	Organic Chemistry I	2017	<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
	CHE-103	Physical Chemistry- I	2017	1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of

				<p>Quantum Mechanics.</p> <p>2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories</p> <p>3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties</p> <p>4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification</p>
	CHE-104	Inorganic Practical- I	2017	<p>1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations.</p> <p>2. To familiarize with techniques of titration and calculation of errors</p>
	CHE-105	Organic Practical-I	2017	<p>1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups.</p>

				2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
	CHE-106	Physical Practical I	2017	<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data
	CHE-107	General Chemistry-I	2017	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS
	CHE-108	Human Values and Professional Ethics – I	2017	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts character and Conduct 3. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics
	CHE-201	Inorganic Chemistry- II	2017	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex

				<p>preparations and properties, nature of bonding and structural features of metal complexes</p> <ol style="list-style-type: none"> 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions
	CHE-202	Organic Chemistry -II	2017	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E_1, E_2 and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening

				<p>reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions.</p> <p>4. To understand the structural elucidation and synthesis of alkaloids using specific reagents.</p>
	CHE-203	Physical Chemistry- II	2017	<ol style="list-style-type: none"> 1. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems 2. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants 3. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem 4. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system

CHE-204	Inorganic Practical- II	2017	<ol style="list-style-type: none"> 1. To separate and determine the two component mixtures 2. To acquire knowledge in the preparation of metal complexes
CHE-205	Organic Practical-II	2017	<ol style="list-style-type: none"> 1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the 2. To get knowledge about the chemical behavior of different components and mechanisms.
CHE-206	Physical Practical -II	2017	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsagar equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry.
CHE-207	General Chemistry-II	2017	<ol style="list-style-type: none"> 1. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and 2. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
CHE-208	Human Values and Professional	2017	<ol style="list-style-type: none"> 1. To understand the concepts of human values,

		Ethics – II		<p>responsibilities of family values and status of women in family and society.</p> <p>2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners</p> <p>3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management.</p> <p>4. To familiarize environmental ethics, ethical theory and ecological crisis</p>
	CHE-EC-301	Physical Chemistry III	2017	<p>1. To know the determination of Character Co-ordinate of C_{2v} point group based on 3N Coordinates and to learn the Mutual exclusion Principle</p> <p>2. To learn the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals</p> <p>3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy</p> <p>4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter,</p>

				concept of Flory-Huggins theory of polymer solutions
	CHE-EC-302	Spectroscopy Applications	2017	<ol style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE-EC-303	Water Analysis	2017	<ol style="list-style-type: none"> 1. To get an idea about water analysis 2. To understand the basic principles of soil analysis 3. To familiarize with instrumentation of potentiometric techniques 4. To gain knowledge on flame photometry and its applications
	CHE-EC-304	Instrumental Methods of Analysis-I	2017	<ol style="list-style-type: none"> 1. To get an idea about water analysis 2. To understand the basic principles of soil analysis 3. To familiarize with instrumentation of

				<p>potentiometric techniques</p> <p>4. To gain knowledge on flame photometry and its applications</p>
	CHE-305	<p>(a) Organic Chemistry III</p> <p>(b) Inorganic Spectroscopy & Thermal Methods of Analysis</p> <p>(c) Green Chemistry</p>	2017	<p>305 A</p> <ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules. 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds. <p>305 B</p>

				<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry. 2. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 3. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron spectroscopy
	CHE-306	(a) Spectral Techniques or (b) Chromatographic Techniques	2017	<p>306 A</p> <ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques. 3. To Understand the applications of AAS. 4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups <p>306 B</p> <ol style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques.

				<ol style="list-style-type: none"> 2. To familiarize applications of different chromatographic methods 3. To Understand the principle of chromatographic techniques 4. To gain knowledge on the normal phase and reverse phase
	CHE-EC-401	Water pollution Monitoring and Environment laws	2017	<ol style="list-style-type: none"> 1. Know about nuclear fission and fusion, uses of solar energy in space heating and water heating, hydropower and water heating, hydropower and production of ethanol from indirect solar energy. 2. Learn physical and chemical properties of water and water complexation in natural and waste water and to understand about global warming, ozone depletion, green house effect and acid rains. 3. Acquire knowledge on composition of inorganic and organic contaminants in soil, soil corrosion and industrial applications of green chemistry. 4. Get knowledge on various methods of solid waste collection and its disposal
	CHE-EC-402	Air pollution, control Methods- Noise and Thermal pollution	2017	<ol style="list-style-type: none"> 1. Acquire knowledge on disease causing agents in water 2. Learn about the removal of suspended and dissolved solids present in waste water

				<ul style="list-style-type: none"> 3. Understand different uses of micro-organisms in environmental protection 4. Know different world life acts such as forest conversion act, water control pollution act and air prevention and control act
	CHE-EC-403	Instrumental Methods of analysis-II	2017	<ul style="list-style-type: none"> 1. To know the basic principles of conductometry and analysis of acids and halides. 2. Colorometric estimation of iron and manganese. 3. To have an idea about working principles of IR, AAS, Spectrofluorimetry, Gas chromatography and HPLC. 4. To familiarize with interpretation of data
	CHE-EC-404	Project work	2017	<ul style="list-style-type: none"> 1. To identify research problem, propose the hypothesis and to collect literature. 2. To perform research designs & experiments 3. To tabulate research result. 4. To conclude research outcomes in the form of dissertation
	CHE-405	<p>(a) Energy, Environment and Soils</p> <p>(b) Bioinorganic, Bioorganic & Biophysical</p>	2017	<p>405 A</p> <ul style="list-style-type: none"> 1. Acquire knowledge on air pollutants, air pollution sampling measurements and analysis caused due to sulphur dioxide, carbon monoxide, nitrogen dioxide, oxidants, ozone, hydro carbons and particulate matter.

		(c) Chemistry of Nanomaterials & Functional materials		<p>2. Learn about different control methods and adsorption of solids and liquids, gas analysis eluents viz., nitrogen oxides, carbon monoxide and hydrocarbons.</p> <p>3. Understand pollution caused by vehicle emission, different industries, cement plants, steel mills and petroleum refineries.</p> <p>4. Know about noise and thermal power project pollutions and their effect on human health.</p> <p>405 B</p> <p>1. Gain knowledge on metallo proteins in electron transfer processes.</p> <p>2. Know the applications of trace metal ions and metal ions as chelating agents in medicine</p> <p>3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters</p>
	CHE-406	(a) Drug Chemistry or	2017	<p>406 A</p> <p>1. Know about natural products.</p>

		(b) Electroanalytical Techniques		<p>2. Know Interpretation of cardiovascular drugs.</p> <p>3. Know the Analyzing about prostaglandins.</p> <p>4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs</p> <p>406 B</p> <p>1. Ability to interpret potentiometry and conductometry.</p> <p>2. Interpretation of results while adhering to DC Polarography.</p> <p>3. Analysing and compiling the data and results in polarography.</p> <p>4. Familiarize Types of ion sensitive electrodes.</p>
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M.Sc., Inorganic Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcomes
	CHE-101	Inorganic Chemistry- I	2017	<p>1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes</p> <p>2. To learn about the polymorphic forms of Carbon,</p>

				<p>Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules</p> <p>3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions</p> <p>4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.</p>
	CHE-102	Organic Chemistry I	2017	<p>1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions</p> <p>2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents.</p> <p>3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates</p>

				4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
	CHE-103	Physical Chemistry- I	2017	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics 2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories 3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties. 4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification
	CHE-104	Inorganic Practical- I	2017	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations. 2. To familiarize with techniques of titration and

				calculation of errors
	CHE-105	Organic Practical-I	2017	<ol style="list-style-type: none"> 1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups 2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
	CHE-106	Physical Practical I	2017	<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data
	CHE-107	General Chemistry-I	2017	<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation. 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS
	CHE-108	Human Values and Professional Ethics – I	2017	<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts character and Conduct

				<p>3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya.</p> <p>4. To understand values of Bhagavd Gita, various religions, religious tolerance, Gandhian ethics</p>
	CHE-201	Inorganic Chemistry- II	2017	<p>1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes</p> <p>2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams.</p> <p>3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods.</p> <p>4. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods.</p>
	CHE-202	Organic Chemistry -II	2017	<p>1. To familiarize the mechanisms of E_1, E_2 and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments.</p> <p>2. To learn the rearrangements involving electron</p>

				<p>deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions</p> <p>3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions.</p> <p>4. To understand the structural elucidation and synthesis of alkaloids using specific reagents</p>
	CHE-203	Physical Chemistry- II	2017	<p>1. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems.</p> <p>2. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants.</p> <p>3. To identify Relation between order of a finite group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem.</p> <p>4. To acquire knowledge on DC-Polarography, AC-</p>

				Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system
	CHE-204	Inorganic Practical- II	2017	<ol style="list-style-type: none"> 1. To separate and determine the two component mixtures. 2. To acquire knowledge in the preparation of metal complexes
	CHE-205	Organic Practical-II	2017	<ol style="list-style-type: none"> 1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the 2. To get knowledge about the chemical behavior of different components and mechanisms
	CHE-206	Physical Practical -II	2017	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsagar equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry
	CHE-207	General Chemistry-II	2017	<ol style="list-style-type: none"> 5. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and 6. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC

	CHE-208	Human Values and Professional Ethics – II	2017	<ol style="list-style-type: none"> 1. To understand the concepts of human values, responsibilities of family values and status of women in family and society. 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management. 4. To familiarize environmental ethics, ethical theory and ecological crisis
	CHE-IC-301	Inorganic Spectroscopy and Thermal Methods of Analysis	2017	<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry 2. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 3. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR. 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV

				photoelectron spectroscopy
	CHE-IC-302	Organic Spectroscopy and Applications	2017	<ol style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE-IC-303 and CHE-IC-304	Core practical I & II Inorganic Chemistry	2017	<ol style="list-style-type: none"> 1. To know the basic principles of instrumental methods of analysis. 2. To familiarize with the analysis of organometallic complex salts. 3. To Understand the complexity, theory and working principle of colourimetry. 4. To gain knowledge on analysis of organic components

	CHE-305A	Organic Chemistry III	2017	<ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds
	CHE-305B	Physical Chemistry III	2017	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_{2V} point group based on 3N Coordinates and to learn the Mutual exclusion Principle 2. To learn the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of

				<p>X-ray structural analysis of crystals.</p> <p>3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational-rotational Raman spectroscopy.</p> <p>4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions</p>
	CHE IC 306 A	Spectral Techniques	2017	<p>1. To know the basic principles of spectroscopy.</p> <p>2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques</p> <p>3. To Understand the applications of AAS.</p> <p>4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups</p>
	CHE IC 306 B	Chromatographic Techniques	2017	<p>1. To know the stationary and mobile phases in chromatographic techniques.</p> <p>2. To familiarize applications of different chromatographic methods</p> <p>3. To Understand the principle of chromatographic</p>

				<p>techniques.</p> <p>4. To gain knowledge on the normal phase and reverse phase</p>
	CHE-IC-401	Coordination compounds, Organo metallic chemistry & Chemistry of non-transition elements	2017	<ol style="list-style-type: none"> 1. To Gain an extensive knowledge about dinitrogen complexes of Ru(II), Os(II), Co(I), Mo(0) and dioxygen complexes of Ir(I) and Rh(I) and on cycloheptatriene and tropylium complexes of oxidative, reductive elimination reactions 2. To understand mechanism, stereochemical aspects and regeneration of catalyst in olefin hydrogenation (Wilkinson's catalyst), olefin oxygenation (Wacker process or Smidt reaction), Olefin hydroformylation and Fischer –Tropsch process. 3. To study the examples of metal complexes having metal-metal single or multiple bonds and analyse the spectroscopic evidences for the presence of metal-metal bond. 4. To understand the synthesis and structures of boranes, carboranes, borazines, silicates carbides, peroxy compounds and inter halogens, pseudohalides
	CHE-IC-402	Instrumental Methods of Analysis	2017	<ol style="list-style-type: none"> 1. To understand the working principles,

				<p>instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-ray fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF).</p> <ol style="list-style-type: none"> 2. To understand the basic principles, procedure and components of the High-Performance Liquid Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC). 3. To get knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis. 4. To improve the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I- and S²⁻) by using I₂ liberations and Ce⁴⁺ liberation in solutions
	CHE-IC-403	Instrumental Methods of Analysis-II	2017	<ol style="list-style-type: none"> 1. To understand the common laboratory techniques including separation techniques. 2. Polarography, atomic absorption spectroscopy in both emission and absorption mode. 3. To gain knowledge on implementation of gas chromatography and HPLC for separation of

				<p>mixtures.</p> <p>4. To Familiarize with interpretation of data to structures by NMR.</p>
	CHE-IC-404	Project work	2017	<ol style="list-style-type: none"> 1. Ability to perform experiments, collection and evaluation of data 2. Interpretation of results while adhering to scientific principles of responsible and ethical behaviour. 3. Analysing and compiling the data and results in a chronological order in the form of dissertation 4. Preparation of dissertation.
	CHE-405	<p>(a) Solid state and Photo Chemistry</p> <p>(b) Bioinorganic, Bioorganic & Biophysical</p> <p>(c) Chemistry of Nanomaterials & Functional materials</p>	2017	<p>405 A</p> <ol style="list-style-type: none"> 1. To understand the working principles, instrumentation and applications of ICP-AES and ICP-MS, energy dispersive X-fluorescence (EDXRF), Wavelength dispersive X-ray fluorescence (WDXRF). 2. To understand the basic principles, procedure and components of the High-Performance Liquid

				<p>Chromatography (HPLC), Gel Permeation Chromatography (GPC): Capillary Electrophoresis (CE), Supercritical Fluid Chromatography (SFC).</p> <p>3. To get knowledge on instrumentation and applications of GCMS in drug analysis and environmental samples analysis</p> <p>4. To improve the knowledge about coulometric techniques and their analysis of cations (As (III), Fe (II)) and anions (I⁻ and S²⁻) by using I² liberations and Ce⁴⁺ liberation in solutions.</p> <p>405 B</p> <p>1. Gain knowledge on metallo proteins in electron transfer processes.</p> <p>2. Know the applications of trace metal ions and metal ions as chelating agents in medicine.</p> <p>3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally.</p> <p>4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters</p>
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	CHE-406	(a) Drug Chemistry or (b) Electroanalytical Techniques	2017	<p>406 A</p> <ol style="list-style-type: none"> 1. Know about natural products. 2. Know Interpretation of cardiovascular drugs. 3. Know the Analyzing about prostaglandins. 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs. <p>406 B</p> <ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes

M.Sc., Organic Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcomes
	CHE-101	Inorganic Chemistry- I	2017	1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic

				<p>properties and bonding in transition metal complexes.</p> <p>2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules.</p> <p>3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions</p> <p>4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule</p>
	CHE-102	Organic Chemistry I	2017	<p>1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions.</p> <p>2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents</p> <p>3. To know the concept of isotope effects, potential energy diagrams and transition states in different</p>

				<p>intermediates</p> <p>4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids</p>
	CHE-103	Physical Chemistry- I	2017	<ol style="list-style-type: none"> 1. To know the concepts such as Operator algebra, Eigen values and Eigen functions, Degeneracy, Schrodinger wave equation and the postulates of Quantum Mechanics 2. To learn about theories of reaction rates, Lindemann, Lindemann-Hinshel wood, and RRKM theories. 3. To know about Thermodynamic concepts and entropy change in reversible process and irreversible process, Gibbs- Duhem equation, calculation of thermodynamic properties. 4. To study the Thermodynamic and Kinetic Derivation of Nernst Equation and the derivation of Debye-Huckle Equation and its Verification
	CHE-104	Inorganic Practical- I	2017	<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that

				<p>are supported by the observations</p> <ol style="list-style-type: none"> To familiarize with techniques of titration and calculation of errors
	CHE-105	Organic Practical-I	2017	<ol style="list-style-type: none"> To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
	CHE-106	Physical Practical I	2017	<ol style="list-style-type: none"> To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different To calibrate the statistical data
	CHE-107	General Chemistry-I	2017	<ol style="list-style-type: none"> To know about mean and median values, standard deviation and coefficient of variation. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS.
	CHE-108	Human Values and Professional	2017	<ol style="list-style-type: none"> To know about the needs and importance of

		Ethics – I		<p>professional ethics.</p> <p>2. To analyze nature of Values, basic Moral Concepts character and Conduct</p> <p>3. To gain knowledge on individual and society ethical values, ahimsa, satya and brahmacharya.</p> <p>4. To understand values of Bhagavad Gita, various religions, religious tolerance, Gandhian ethics</p>
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	CHE-201	Inorganic Chemistry- II	2017	<p>1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes</p> <p>2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams</p> <p>3. To understand about the laws of Hund's, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Faraday methods</p> <p>4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions</p>
	CHE-202	Organic Chemistry -II	2017	<p>1. To familiarize the mechanisms of E₁, E₂ and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes, chemical trapping and crossover experiments</p>

				<p>2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions</p> <p>3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions.</p> <p>4. To understand the structural elucidation and synthesis of alkaloids using specific reagents.</p>
	CHE-203	Physical Chemistry- II	2017	<p>5. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems</p> <p>6. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants</p> <p>7. To identify Relation between order of a finite group and its subgroup, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem</p> <p>8. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system</p>

	CHE-204	Inorganic Practical- II	2017	<p>3. To separate and determine the two component mixtures</p> <p>4. To acquire knowledge in the preparation of metal complexes</p>
	CHE-205	Organic Practical-II	2017	<p>3. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the</p> <p>4. To get knowledge about the chemical behavior of different components and mechanisms.</p>
	CHE-206	Physical Practical -II	2017	<p>3. To study the determination of cell constant and verification of Onsagar equation, strength of strong</p> <p>4. To get knowledge on the applications of conductometry, potentiometry, coulometry and pH metry.</p>
	CHE-207	General Chemistry-II	2017	<p>3. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and</p> <p>4. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC</p>
	CHE-208	Human Values and Professional Ethics – II	2017	<p>5. To understand the concepts of human values, responsibilities of family values and status of women in family and society.</p> <p>6. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical</p>

				<p>practitioners</p> <p>7. To gain knowledge on social ethics and understand the characteristics of ethical problems in management.</p> <p>8. To familiarize environmental ethics, ethical theory and ecological crisis</p>
	CHE-OC-301	Organic Chemistry III	2017	<p>1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules</p> <p>2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents</p> <p>3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions</p> <p>4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds</p>
	CHE-OC-302	Organic Spectroscopy and Applications	2017	<p>1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds</p> <p>2. To familiarize with the absorption bands of the molecules with</p>

				<p>specific functional groups</p> <ol style="list-style-type: none"> 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided 4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE OC 303 & 304	Core practical I: Organic Estimations - Practical	2017	<ol style="list-style-type: none"> 1. To gain knowledge about the estimation/percent purity of different organic molecules. 2. To get hands-on-experience with the synthesis and determination of concentrations and purity 3. To acquire knowledge in handling of toxic chemicals in multi step preparation of biologically important 4. To gain experience in the proposal of synthetic routes to functionalized derivatives
	CHE-OC- 305 A	Inorganic Spectroscopy and Thermal Methods of Analysis	2017	<ol style="list-style-type: none"> 1. To know the basic principles of instrumental methods of analysis. 2. To gain knowledge on chemistry of alloys. 3. To Understand the complexity, theory and working principle of colourimetry 4. To familiarize with laws of colorimetric titrations.
	CHE-OC- 305 B	Physical Chemistry III	2017	<ol style="list-style-type: none"> 1. To know the determination of Character Co-ordinate of C_{2V} point group based on 3N Coordinates and to learn the Mutual

				<p>exclusion Principle.</p> <ol style="list-style-type: none"> To learn the Bragg conditions-Miller Indices- Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational- rotational Raman spectroscopy. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
	CHE OC 306 (A)	Spectral Techniques	2017	<ol style="list-style-type: none"> To know the basic principles of spectroscopy To familiarize with the analysis of various functional groups by using different spectroscopic techniques. To Understand the applications of AAS. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups
	CHE OC 306 (B)	Chromatographic Techniques	2017	<ol style="list-style-type: none"> To know the stationary and mobile phases in chromatographic techniques To familiarize applications of different chromatographic methods To Understand the principle of chromatographic techniques.

				4. To gain knowledge on the normal phase and reverse phase.
	CHE-OC-401	Organic synthesis I	2017	<ol style="list-style-type: none"> 1. Familiarize with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents 2. Learn about photolytic reactions of carbonyl compounds, conjugated carbonyl derivatives, olefins, conjugated dienes CO₃:To gain knowledge in the determination of allowed or forbidden of chemical reactions <i>viz.</i>, cycloaddition and 3. Learn the methods of preparation, properties, and industrial applications of various addition and condensation 4. Familiarize with the unique reactivity of Boron, Phosphorus, Sulfur and Silicon reagents
	CHE-OC 402	Organic Synthesis II	2017	<ol style="list-style-type: none"> 1. Familiarize with functionalization and interconversion of functional groups and the concept of organic synthesis by retrosynthetic approach 2. Gain knowledge in the formulation of synthetic routes for naturally occurring drugs. 3. Understand quinoline, acridine and guanidine group of alkaloids as antimalarials and to familiarize with the role of functioning of broad spectrum antibiotics. 4. Acquire knowledge about the classification, properties,

				structure & conformation and biological functions of peptides/proteins
	CHE OC 403	Core practical I: Spectral Identification of Organic Compounds	2017	<ol style="list-style-type: none"> 1. Calculate λ max values. 2. Ascertain functional groups. 3. Interpret the spectral data to the structure and stereochemistry of the molecules. 4. Analyse the fragmentation pattern of the molecules.
	CHE OC 404	Practical II: Project Work	2017	<ol style="list-style-type: none"> 1. Identify the problem, to collect the literature and understanding parameters to design the problem. 2. Perform experiments to synthesize the molecules with desired stereochemistry adopting modern techniques 3. Collect and interpretation of the data to the structures 4. Presentation of the data in the form of dissertation
	CHE-OC- 405A	Heterocycles and Natural Products	2017	<ol style="list-style-type: none"> 1. Familiarize with the synthetic routes of five membered heterocycles with two heteroatoms and to justify the site of 2. Acquire knowledge on the synthetic methodologies of benzofused and six membered heterocycles and the effect of 3. Familiarize with the structural elucidation and synthesis of naturally occurring steroids and hormones 4. Know about isolation, structural determination and synthesis

				of flavonoids and isoflavonoids
	CHE-OC-405B	Bioinorganic, Bioorganic, Biophysical Chemistry	2017	<ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes. 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally. 4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters
	CHE OC 406A	Drug Chemistry	2017	<ol style="list-style-type: none"> 1. Know about natural products 2. Know Interpretation of cardiovascular drugs. 3. Know the Analyzing about prostaglandins 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs.
	CHE OC 406B	Electroanalytical Techniques	2017	<ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes

M.Sc., Physical Chemistry

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcomes
1	CHE-101	INORGANIC CHEISTRY I	2017	<ol style="list-style-type: none">1. To understand the key features of coordination compounds, Crystal Field Theory, magnetic properties and bonding in transition metal complexes2. To learn about the polymorphic forms of Carbon, Sulphur and Phosphorus, synthesis and properties of sulphur-nitrogen compounds, boranes, carbides, silicates and to know Wades rules.3. To explain the reactivity of complexes in terms of Valence bond and Crystal Field theories, Taube's classification, Trans effect and Electron Transfer Reactions.4. To gain knowledge on synthesis and structures of different metal carbonyls, synergistic effect and 18 electron rule.

2	CHE-102	Organic Chemistry I		<ol style="list-style-type: none"> 1. To detect stereochemical structures of the molecules, stereoselective and stereocontrolled reactions. 2. To ascertain the stereochemistry of the products with the effect of neighbouring group participation and to familiarize the various types of aromatic substitution reactions, their mechanism and the effect of substituents 3. To know the concept of isotope effects, potential energy diagrams and transition states in different intermediates 4. To familiarize with stereospecific synthesis of naturally occurring terpenoids and degradation products of terpenoids
3	CHE 104	Core practical I: Inorganic Chemistry		<ol style="list-style-type: none"> 1. To demonstrate mastery of basic semi-micro qualitative analysis of simple salts and interprets analytical data and will make scientific claims that are supported by the observations 2. To familiarize with techniques of titration and calculation of errors

4	CHE 105	Core practical I: Organic Chemistry		<ol style="list-style-type: none"> 1. To familiarize the systematic procedures of analysis of organic components, conformational tests for various functional groups 2. To understand the mechanisms and familiarize with methodologies to prepare biologically important molecules
5	CHE 106	Core practical I: Physical Chemistry		<ol style="list-style-type: none"> 1. To study the determination of critical solution temperature, eutectic composition, distribution coefficient, adsorption of different 2. To calibrate the statistical data
6	CHE-107	General Chemistry I		<ol style="list-style-type: none"> 1. To know about mean and median values, standard deviation and coefficient of variation 2. To acquire knowledge on principle and instrumentation of AAS and difference between flame AAS and furnace AAS
7	CHE 108	Human Values and Professional Ethics-I		<ol style="list-style-type: none"> 1. To know about the needs and importance of professional ethics. 2. To analyze nature of Values, basic Moral Concepts character and Conduct 3. To gain knowledge on individual and society

				<p>ethical values, ahimsa, satya and brahmacharya.</p> <p>4. To understand values of Bhagavd Gita, various –</p> <p>5. /*religions, religious tolerance, Gandhian ethic--</p>
	CHE - 201	Inorganic Chemistry II	2017	<ol style="list-style-type: none"> 1. To familiarize with the general methods of complex preparations and properties, nature of bonding and structural features of metal complexes 2. To know about Russel-Saunders coupling, splitting of energy levels in octahedral field and differentiate between Orgel diagrams and Tanabe-Sugano diagrams 3. To understand about the laws of Hunds, Curie and Weiss, magnetism and magnetic susceptibility determination by Gouy's and Farady methods 4. To gain knowledge on Induced reactions, Free radical reactions, Thermal decomposition reactions, Chain reactions
	CHE-202	Organic Chemistry II	2017	<ol style="list-style-type: none"> 1. To familiarize the mechanisms of E₁, E₂ and E_{1CB} reactions, stereoselectivity and synpyrolytic eliminations and use of isotopes,

				<p>chemical trapping and crossover experiments.</p> <ol style="list-style-type: none"> 2. To learn the rearrangements involving electron deficient carbon, nitrogen and oxygen atoms and electron rich carbon atom and familiarize with the limitations and applications of reactions. 3. To learn the synthesis of three and four membered heterocycles, mechanism of ring opening reactions and the effect of electron donating and withdrawing substituents in selectivity of ring opening reactions. 4. To understand the structural elucidation and synthesis of alkaloids using specific reagents
	CHE -203	Physical chemistry II	2017	<ol style="list-style-type: none"> 1. To know about Pauli Exclusion principle and Slater determinant, atomic orbitals, Simple molecular orbitals and Huckel theory of conjugated systems 2. To learn Gibbs adsorption isotherm, BET equation and correlate limitations, critical micellar concentration (CMC) and factors affecting the CMC of surfactants. 3. To identify Relation between order of a finite

				<p>group and its sub-group, conjugacy, Symmetry point group (MLS, MHS and MSS) and orthogonality theorem</p> <p>4. To acquire knowledge on DC-Polarography, AC-Polarography, Controlled Potential Electrolysis, to derive equation for Tafel plots, half-wave potentials for reversible system</p>
	CHE 204	Core practical I: Inorganic Chemistry	2017	<ol style="list-style-type: none"> 1. To separate and determine the two component mixtures. 2. To acquire knowledge in the preparation of metal complexes
	CHE 205	Core practical II: Organic Chemistry	2017	<ol style="list-style-type: none"> 1. To familiarize with binary mixture separation and to gain hands-on-experience in purification of the 2. To get knowledge about the chemical behavior of different components and mechanisms
	CHE 206	Core practical II: Physical Chemistry	2017	<ol style="list-style-type: none"> 1. To study the determination of cell constant and verification of Onsager equation, strength of strong 2. To get knowledge on the applications of conductometry, potentiometry, coulometry and

				pH metry
	CHE-207	General Chemistry II	2017	<ol style="list-style-type: none"> 1. To acquire knowledge on ion selective electrodes, solid membrane electrodes and glass electrodes and 2. To learn general principles and classifications of chromatographic separations and applications of TLC, GLC
	CHE 208	Human Values and professional ethics-II	2017	<ol style="list-style-type: none"> 1. To understand the concepts of human values, responsibilities of family values and status of women in family and society. 2. To acquire knowledge on different medical ethics the views of charaka and sushruta on moral responsibilities of medical practitioners 3. To gain knowledge on social ethics and understand the characteristics of ethical problems in management 4. To familiarize environmental ethics, ethical theory and ecological crisis
	CHE-PC-301	Physical Chemistry III	2017	<ol style="list-style-type: none"> 1. To know the determination of Character Coordinate of C_{2v} point group based on $3N$ Coordinates and to learn the Mutual exclusion

				<p>Principle</p> <ol style="list-style-type: none"> 2. To learn the Bragg conditions-Miller Indices-Laue method, Bragg method, Debye Scherrer method of X-ray structural analysis of crystals 3. To study the rigid rotator model, stark effect, vibration-rotation spectroscopy, PQR branches, selection rules and Vibrational-rotational Raman spectroscopy 4. To study the concepts on heat of dissolution, regular solution theory, Hildebrand solubility parameter, concept of Flory-Huggins theory of polymer solutions
	CHE-PC 302	Organic Spectroscopy and Applications	2017	<ol style="list-style-type: none"> 1. To get experience to calculate λ max values for dienes, enones, polyenes, aromatic and heteroaromatic compounds. 2. To familiarize with the absorption bands of the molecules with specific functional groups 3. To interpret the data to different types of protons and carbons present in a molecule so as to ascertain the structure of the molecule based on the data provided

				4. To acquire knowledge about specific fragmentation rules of different molecules which are unique
	CHE PC 303 & 304	Core practical I: Physical Chemistry-practicals I & II	2017	<ol style="list-style-type: none"> 1. To study chemical kinetics of homogeneous solutions 2. To gain knowledge on the determination of different cations by flame photometry 3. To understand the principle and working aspects of conductometric titrations 4. To acquire knowledge on the implementation of colorometric estimations 5. To study chemical kinetics of homogeneous solutions
	CHE PC 305 A	Organic Chemistry III	2017	<ol style="list-style-type: none"> 1. To familiarize with the specific functions of the reagents particularly diazomethane, N-bromosuccinimide, Ziegler Natta catalyst, 1,3-dithianes and Merrifield resin in the synthesis of a variety of complex molecules 2. To gain knowledge in the synthesis of different organometallic reagents and also stereo and regio specificity and selectivity of reactions with organometallic reagents

				<ol style="list-style-type: none"> 3. To understand diastereoselectivity, stereoselectivity and substrate controlled auxillary controlled reactions 4. To acquire knowledge about the reagents which causes oxidation in various compounds and also the reagents that causes selective and complete reductions to synthesize various compounds.
	CHE-PC- 305 B	Inorganic Spectroscopy and Thermal Methods of Analysis	2017	<ol style="list-style-type: none"> 1. To know about TG and DTA and applications of different scanning calorimetry. 2. To learn zero field splitting and Kramer's degeneracy, relaxation processes, instrumentation and applications of ESR 3. To gain knowledge on Doppler shift and chemical shift, basic principles and applications of NQR spectroscopy 4. To know about photoelectric effect and Koopmans theorem and impart the applications of X-ray and UV photoelectron
	CHE PC 306 A	Spectral Techniques	2017	<ol style="list-style-type: none"> 1. To know the basic principles of spectroscopy. 2. To familiarize with the analysis of various functional groups by using different spectroscopic techniques.

				<ul style="list-style-type: none"> 3. To Understand the applications of AAS 4. To gain knowledge about Mass spectral fragmentation of organic compounds and common functional groups
	CHE PC 306 B	Chromatographic Techniques	2017	<ul style="list-style-type: none"> 1. To know the stationary and mobile phases in chromatographic techniques. 2. To familiarize applications of different chromatographic methods. 3. To Understand the principle of chromatographic techniques 4. To gain knowledge on the normal phase and reverse phase
	CHE-PC- 401	Electrochemistry	2017	<ul style="list-style-type: none"> 1. Know the techniques of deposition of metals, throwing power simultaneous discharge of cations and methods of corrosion protection 2. Learn about electrochemical Batteries, fuel cells and nickel-cadmium batteries 3. Understand electrical double layer systems, sedimentation potential, null points of metals and zeta potential

				4. Calculate electrochemical parameters; familiarize mixed ligand systems and reversible systems
	CHE-PC 402	Thermodynamics, Polymers and Solid-state Chemistry	2017	<ol style="list-style-type: none"> 1. Derive Gibbs Duhem equation and to calculate fugacity and chemical potential 2. Calculate excess free energy and entropy, to draw Hildebrand curves and to correlate excess functions and activity coefficients 3. Learn morphology, T_m and T_g points and to calculate transition temperatures and to identify cross linking in polymers 4. Identify magnetic properties of solids, magnetic materials, superconductors and BCS theory
	CHE PC 403	Core practical I: Inorganic Chemistry - Practical	2017	<ol style="list-style-type: none"> 1. To perform titration of mixture of halides and to draw potentiometry curves 2. To learn amperometric titrations and mixtures by polarography 3. To Correlation of data obtained from IR, AAS, HPLC and GC 4. To Determination of alkalinity and purity by pH metry

	CHE PC 404	Project Work	2017	<ol style="list-style-type: none"> 1. To identify research problems and to collect research literature 2. To propose hypothesis of a research problem 3. To perform research experiments 4. To analyse the data and conclude the research outcomes
	CHE-PC-405A	Chemical Kinetics	2017	<ol style="list-style-type: none"> 1. Draw skrabal pH diagram and to separate unimolecular and bimolecular reactions 2. Study laws of photochemistry, to derive stern-volmer equation 3. Identify chromo potentiometry points and to investigate kinetic currents and isotopic effects 4. Learn photochemical thresholds, chemiluminescence
	CHE-PC-405B	Bioinorganic, Bioorganic, Biophysical Chemistry	2017	<ol style="list-style-type: none"> 1. Gain knowledge on metallo proteins in electron transfer processes 2. Know the applications of trace metal ions and metal ions as chelating agents in medicine. 3. Achieve and develop highly stereoselective synthesis of organic compounds and drugs by adopting environmentally

				4. Understand thermodynamics of biopolymer reactions and to correlate free energy and biopolymer parameters
	CHE PC 406A	Drug Chemistry	2017	<ol style="list-style-type: none"> 1. Know about natural products. 2. Know Interpretation of cardiovascular drugs 3. Analyzing about prostaglandins. Know the 4. Know the Definition, Classification, Nomenclature, Structure and Synthesis of anti-inflammatory drugs
	CHE PC 406 B	Electroanalytical Techniques	2017	<ol style="list-style-type: none"> 1. Ability to interpret potentiometry and conductometry 2. Interpretation of results while adhering to DC Polarography. 3. Analysing and compiling the data and results in polarography. 4. Familiarize Types of ion sensitive electrodes

26.Environmental Sciences

S.	Course Code	Title of the Course	Years of	Course outcomes
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No.			Introduction	
1	ENV-101	Ecology and Environment	2017	<ul style="list-style-type: none"> • To impart the knowledge on ecology and structure and functions of ecosystems. • To inculcate ethics and learning in ecosystem imbalance, health and environment. • To analyze soil profile and its importance of ecological balance. • To estimate the nutrients in the different soil samples. • Provide solutions to environmental problems using appropriate tools and techniques. • Develop both a quantitative and qualitative understanding of interactions between organisms and their consequences. • Gain the knowledge of functions of organisms and ecosystem. • Describe programmes environmental protection by implementing eco-friendly for human existence.
2	ENV -102	Environmental Chemistry	2017	<ul style="list-style-type: none"> • To understand emissions and distribution of the air pollutants and particles in the atmosphere. • To identify chemical properties and reactions of the compounds in the air. • To understand the primary and secondary pollutants

				<p>and its effects.</p> <ul style="list-style-type: none"> • To inculcate non polluted environment using green chemistry. • Demonstrate knowledge of chemical and biochemical principles of fundamental environmental processes in air, water and soil. • Apply basic chemical concepts to analyze chemical processes involved in different environmental problems. • By knowing pollution levels in the environment best possible fresh environment can be created in different methods like afforestation, natural parks and sanctuaries etc., for human concern. • Acquire the knowledge to implementation of biological alternatives for protection of the environment.
3	ENV-103P	Practical – I	2017	<ul style="list-style-type: none"> • To estimate population of flora and fauna in the ecosystem. • To examine nutrients levels in various samples of wastewater. • To estimate the protein, carbohydrates and nucleic acid in the different species.

				<ul style="list-style-type: none"> • To examine the natural condition for species survival. • Imparting practical knowledge about estimation of pH, Total Dissolved Solids, Hardness and Dissolved Oxygen, Chlorides and Sulphates in water samples. • Imparting practical knowledge about estimation of pH, Total Dissolved Solids, Hardness and Dissolved Oxygen, Chlorides and Sulphates in water samples. • Understand the environmental changes due to pollution levels. • Examine the various ecosystems and its biodiversity.
4	ENV-104P	Practical-II	2017	<ul style="list-style-type: none"> • To examine the contamination of the environment with chemical load by spectroscopic technology. • To analyze the concentration of the metals in the environment. • To inculcate the knowledge in scientific instrumentation. • To understand applications of organic matter in soils. • Understanding of various alkalinities present in the water sample by volumetric titration linked with theory. • By knowing water pollution potable water can be drawn out and wastewater can be treated.

				<ul style="list-style-type: none"> • By knowing various experiments of minerals fertility of the soil can be known which is advantage to farmers for agriculture. • Describe the advantages of organic forming.
5	ENV-105	Environmental Toxicology and Public Health	2017	<ul style="list-style-type: none"> • To introduce the applications of environmental toxicology in the context of public health. • To focus on the fate of chemicals in our environment and routes of exposure. • To understand the epidemic diseases and control methods. • To impart the knowledge in understanding of biotechnology for degradation of waste products in the environment. • Understand the role of toxicants in environment and methods used to quantify toxicity. • Inform, educate, and empower people about the potential hazards of toxic substances to environmental and human health. • By knowing the adverse health problems on human beings, safety, preventing measures can be implemented endemic and pandemic diseased can be controlled.

				<ul style="list-style-type: none"> • Understand the toxicity of pesticide, detoxification metals on public health.
6.	ENV-106	Human Values and Professional Ethics-I	2017	<ul style="list-style-type: none"> • To inculcate the knowledge on professional and ethical values. • To understand classification of moral and ethical values in traditional texts. • To describe enlightenment and social behavior towards the various religious and society. • To create social values and professional ethics. • Describe the human values, understand the commitment and responsibility. • They gain the ability to bring harmony to the society. • By studying human values reformation of man and reformation of policy shall be done and harmony of environment and society also can be achieved. • Moral code of conduct and social behavior towards religion and social harmony.
7.	EN-201	Energy and Environment	2017	<ul style="list-style-type: none"> • To understand energy concepts for conventional and renewable energy technologies and their application. • To provide energy production methods and consequent environmental impacts. • To understand sources of various green energy and

				<p>applications.</p> <ul style="list-style-type: none"> • To inculcate the bio-energy practices for maintain environmental quality. • Explain the key challenges and technologies in energy use, utilization of energy resources, energy conversion and environmental consequences. • They explain basic competence regarding environmental impacts arising from different energy carriers and technical solutions. • Enrichment of ecosystem will be achieved. • Explain energy planning for future generations.
8.	ENV-202	Environmental Pollution	2017	<ul style="list-style-type: none"> • To understand route way of pollutants and their impacts on the environment. • To impart the knowledge on diseases caused by pollution. • To understand classification of pollution, predictions and consequences of society. • To understand safe disposal of radioactive wastes. • Analyze sources of pollution, exposure pathways, fate and evaluate consequences of human exposure to pollution and its impacts to environmental quality.

				<ul style="list-style-type: none"> • Distinguish the effect of pollutants on human health, economy and wild environments. • Pollution free environment for human life will be achieved. • Explain the contamination of water bodies due to discharge of untreated wastewater into the drain.
9.	ENV-203P	Practical-I	2017	<ul style="list-style-type: none"> • To analyze wastewater and pond water samples. • To estimate the concentration of various metals in environment. • To analysis of toxicants in environmental samples. • To understand bioaccumulation of pesticides. • Describe the amount of pesticide/insecticide in water/vegetable samples. • Report the values of analyzed inferences of the experiments. • Assess the concentrations of pollutants. • Explain the formation of photochemicals.
10.	ENV-204P	Practical-II	2017	<ul style="list-style-type: none"> • To understand the difference of LC₅₀ and LD₅₀. • To evaluate the samples like water, soil and biological. • To examine the growth rate of fauna in different habitats.

				<ul style="list-style-type: none"> • To assess micro and macro nutrients in the soil samples. • Identify the concentration of biochemical by using instrumental methods. • Applications of scientific methods for analysis of pollution. • Applications of basic scientific principle in the evaluation of pollution by instruments.
11	ENV-205	Instrumental Techniques and Applications	2017	<ul style="list-style-type: none"> • To impart the knowledge in instrumental techniques. • To understand in the operation and care of instruments used in the chemical laboratories. • To inculcate chromatographics in plant pigments. • To understand value of nanotechnology. • Integrate a fundamental understanding of the underlining physics principles as they relate to specific instrumentation used for atomic, molecular, and mass spectrometry, magnetic resonance spectrometry and chromatography. • Environmental potentiality will be achieved. This is indirect benefits to the society. • Understand the analysis and level of concentration of different metals through instrumental techniques.

				<ul style="list-style-type: none"> • Explain Nanotechnology and Nano Engineering and Nano Science.
12	ENV-206	Human Values and Professional Ethics-II	2017	<ul style="list-style-type: none"> • To create an awareness on professional ethics and Human Values. • To appreciate the rights of others. • To understand environmental ethics. • To create an awareness on social ethics. • Understand the core values that shape the ethical behaviour. • An ability to apply their broad education towards the understanding of the impact of engineering solutions in a global and societal context. • Making the students to full man, understanding the ethical values. • Ability to achieve ethics in medical, business, environment and social.
13	ENV -301	Waste Treatment and Management	2017	<ul style="list-style-type: none"> • To understand purification practices for wastewater. • To emphasize on design considerations of various unit operations and processes of water treatment facilities. • To characterize the waste and apply the knowledge of laws for handling of various wastes and

				<p>management.</p> <ul style="list-style-type: none"> • To understand the reduction of environmental pollution by recycling the waste products. • Describe the components of solid waste management and the laws governing it. • Discuss the solid waste collection systems, route optimization techniques and processing of solid wastes. • Biodegradation of waste through natural and artificial methods will be achieved. • Evaluating solid waste management practices in urban and rural environment. • Explain minimize and reduce waste generation through applications of 3 R's policy.
14	ENV -302	Environmental Assessment, Audit and Economics	2017	<ul style="list-style-type: none"> • To introduce and provide theoretical and practical education on environmental impact assessment. • To assess the economic burden of environmental cause. • To focus on the rationale and methodology of integrated environmental impact assessment (EIA) including consideration of the relevant bio-physical, social, cultural, economic and human health aspects

				<p>of development proposals, programs and policies.</p> <ul style="list-style-type: none"> • To understand financial impact of environmental policy. • Explain the concepts about the Environmental Impact Assessment (EIA) and describe the environment laws, aims and the necessity of EIA. • Critically examine assumptions inherent in impact assessment, examine a range of environmental impact assessments and identify and explore impact assessment fields and approaches. • Understand the sustainable development and controlling environmental pollution. • Describe the environmental economics for sustainable development.
15	ENV -303	Practical-I	2017	<ul style="list-style-type: none"> • To prepare EIA for project management and environmental statement for industries. • To estimate the presence of sedimentary particles by scientific methods. • To analyze environmental impact for well being of the society. • Understand the degradation of natural resources by constructions of various projects.

				<ul style="list-style-type: none"> • Understand requirement of oxygen for growth of organisms to break down organic matter in wastewaters. • Describe the low cost wastewater treatment practices in water demand areas.
16	ENV-304	Practical-II	2017	<ul style="list-style-type: none"> • To construct practical statistical models for several processes in the real-world. • To understand coefficient of two variable in samples. • To understand the basic operations of a computer system. • It helps to explain the relationships between variables of the real-world applications. • Analyze evaluation of two variables. • Develop the programming techniques and the problem solving skills through programming.
17	ENV-305A	Disaster Mitigation and Management	2017	<ul style="list-style-type: none"> • To obtain, analyze and communicate information on risks and relief needs. • To assess review and control the risk. • To develop methods of risks analysis and evaluation of accidents in industrial development. • To inculcate economic evaluation of risks after the disaster.

				<ul style="list-style-type: none"> • Understand the mitigation approaches, their choices and alternatives. • Develop foundations for hazard, risk and vulnerability assessment. • Explain the knowledge on disaster preparedness to meet risks in natural disasters. • Know about the economic evaluation of risks and frame work for sustainable development.
18	ENV-305B	Biodiversity Conservation and Management	2017	<ul style="list-style-type: none"> • To assess biodiversity loss and the importance of biodiversity conservation. • To emphasis regional diversity hotspots and important conservation areas. • To develop biotechnological methods in pollution abatement and develop eco-friendly bio-products for environmental health. • To acquire knowledge in environmental management through biological system. • Systematically understand biodiversity and its vital role in ecosystem function. • Understand the value of biodiversity and current threats to biodiversity. • Describe Environment of nature.

				<ul style="list-style-type: none"> • Explain the conservation of the environment by adopting bio treatment for waste degradation.
19	ENV-305C	Statistics, Computer Applications and Modeling	2017	<ul style="list-style-type: none"> • To assess the strengths of the conclusions and evaluating their uncertainty in the data. • To understand importance of computer applications in business, education and research. • To develop appropriate mathematical models to predict environmental changes. • To understand mathematical tools used in modeling. • Analyze data using standard statistical techniques. • Utilize the Internet Web resources and evaluate on-line e-business system. • Environmental analysis, forecasting of the environment can be achieved. • Evaluate test significant for ecological predictions.
20	ENV-306A	Natural Resources Conservation	2017	<ul style="list-style-type: none"> • To introduce the importance of natural resources and its management. • To integrate technical field knowledge with analytical skills to solve important natural resource management problems. • To understand different practices of agriculture and its impact on environment and food stock.

				<ul style="list-style-type: none"> • To understand use and exploitation of mineral and food resources daily life. • Application of theories and methods with interdisciplinary approach towards natural resource management. • Critically examining the gap in the resource availability, use and conservation. • Environment conservation and employment generation. • Describe sustainable agriculture management.
21	ENV-306B	Environmental Education and Sustainability	2017	<ul style="list-style-type: none"> • To identify the interconnected and interdisciplinary nature of environmental studies. • To expand the knowledge of liberal arts for understanding the relationship between humans and their environment. • To analyze environmental priorities and develop appropriate strategies for programme implementation. • To understand environmental education and awareness for sustainable development. • Demonstrating an integrative approach to environmental issues with a focus on sustainability.

				<ul style="list-style-type: none"> • Communicating complex environmental information to both technical and non-technical audiences. • Enriches the students with knowledge of environmental problems and appropriate solutions to overcome them. • Describe the eco-friendly techniques to meet future challenges.
22	ENV-401	Water Resources and Watershed Management	2017	<ul style="list-style-type: none"> • To develop an understanding of the occurrence and availability of freshwater, its uses, and problems related to water resources management. • To learn more about managing our water resources and solve societal and environmental woes. • To understand traditional water conservation methods and equitable use of water for sustainable development. • To develop more rainwater conservation practices for future generations. • Understand water's importance as a precious resource. • Provide a basic understanding of the impact of water and water-related issues in a global, economic, environmental and societal context.

				<ul style="list-style-type: none"> • Describe the management of water resources through construction of watersheds for future generations. • Understand value and role of the water resources for sustainable growth and development.
23	ENV-402	Remote Sensing and GIS	2017	<ul style="list-style-type: none"> • To provide background knowledge and understanding of principles of RS and RS systems. • To enhance capacity to interpret images and extract information on the earth surface from multi-resolution imagery at multi-scale level. • To analyze satellite data in understanding forest, water resources, agricultural and soil coverage. • To find the degradation level of environmental parameters through remote sensing applications. • Laying foundations for understanding Remote Sensing and Geographic Information System as a powerful tool for geospatial analysis. • Evaluating the application of RS-GIS techniques to the matrices of environment and resource management. • Future predictions of the environment will be known about weather. • Explain the damages occurred in the environment by

				GIS.
24	ENV-403	Practical-I	2017	<ul style="list-style-type: none"> • To estimate the various metals by using instrumental techniques. • To understand the coverage of watershed development from aerial photos. • To recognize geomorphological characters from aerial survey. • Analyze the multi elements in various wastewater samples. • Understand the quality of ground water. • Describe extend of drainage area with its hazardous characters.
25	ENV-404	Project Work and Comprehensive Viva-Voce	2017	<ul style="list-style-type: none"> • To understand the concepts of project management for better execution of projects. • To identify the different funding agencies for environmental protection. • To develop valuable social networking which increases public participation in environmental management. • Understanding project characteristics at its various stages of implementation. • Estimating the cost of physical and human resources

				<p>and making plans to obtain the necessary resources.</p> <ul style="list-style-type: none"> • Developing young researchers with appropriate exposure and necessary training.
26	ENV-405 A	Ecotourism and Eco-restoration	2017	<ul style="list-style-type: none"> • To impart the knowledge in understanding the concepts of eco-tourism. • To describe about the Eco-tourism and wildlife tourism in protected areas, planning and economics. • To understand major sources of environmental degradation and its consequences on biodiversity. • To understand soil fertility by adopting eco-restoration. • Describe the challenging in eco-tourism and wildlife tourism. • Understand values of wildlife and minimizing impact on natural ecosystem due to tourism. • Rest and recreation to the public and income generation for the Government. • Eco solutions will be achieved.
27	ENV-405 B	Environmental Laws, Policies and Legislation	2017	<ul style="list-style-type: none"> • To prevent, minimize, remedy and punish actions that threaten or damage the environment. • To preserve and protect the nature's gifts from pollution by implementation of environmental laws

				<p>and policies.</p> <ul style="list-style-type: none"> • To understand environmental public policy strategies in pollution control. • To understand environmental laws and acts for protect and conservation of environment. • Understanding judicial response to environmental issues in India. • Acquiring the ability to evaluate the role of law and policy in conservation and management of natural resources and prevention of pollution. • It enhances the societies support for environment's protection programmes. • Develop the environmental quality through implementation of environmental laws and acts.
28	ENV-405 C	Environmental Management and Sustainable Development	2017	<ul style="list-style-type: none"> • To develop skill in management of environment in a global level. • To understand the environmental knowledge into action in order to achieve particular outcomes in the way landscapes, societies and/or natural ecosystems are used and managed. • To provide skills and an improved understanding of how firms and organisations work with sustainability

				<p>issues.</p> <ul style="list-style-type: none"> • To understand sustainable environmental management by implementing policy principles. • Explain the environmental management practices. • Ability to analyze environmental management in relation to the major principles of sustainable development. • The ability to work effectively to create environmental management analysis outputs of professional quality, both independently and within team environments. • Develop innovation strategies for sustainable development at local and national level.
29	ENV-406 A	Forest Resources and Management	2017	<ul style="list-style-type: none"> • To provide desired physical, chemical and biological soil processes and functions on the Forests to maintain and/or improve soil productivity. • To create basic strategies for forest management like plantation forestry, natural forest management and agroforestry. • To build synergy with national and international agencies on environmental conservation. • To awareness of the disadvantages of deforestation

				<p>and further conservation.</p> <ul style="list-style-type: none"> • Demonstrating knowledge of forest vegetation modeling to forecast its development over time. • Integrating knowledge of basic biology, physical and social sciences, forest and wildlife ecology. • Through forest management national economy will be improved. • Describe preparation and development of action plan for conservation of forests.
30	ENV-406 B	Global Environmental Issues	2017	<ul style="list-style-type: none"> • To promote an investigation of the scientific principles behind global environmental issues. • To develop a world which is eco-friendly and pro for sustainable development. • To develop new dimensions to environment – human relationships. • To develop non polluting energy resources. • Predicting the consequences of human actions on quality of human life and global economy. • Developing critical thinking for shaping strategies for environmental protection and its conservation. • Updating the global environmental laws binding on the Governments.

				<ul style="list-style-type: none"> Establish awareness on environment to meet future challenges.
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27. Fishery Sciences & Aquaculture

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcomes
1	AQC 101	Concepts of Aquatic Ecology	2017	i. Understanding the General Characteristics, Principles of classification, Aquatic Ecology Communities. ii. To understand the various Physical and chemical characteristics of water.
2	AQC 102	Systematics And External Anatomy of Cultivable Organisms	2017	i. Understand the concepts of finfish and shellfish systematics and anatomy. ii. iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations, Natural Selection and Genetic drift. iv. Understood the concepts of Micro, Macro evolution speciation categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.

3	AQC 103 A	Fish Nutrition and Water Quality Management	2017	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respect to their habit and habitat.</p> <p>iii. Understanding the comparative aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in taxonomy related research and job opportunities.</p> <p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p>
4	AQC: 103 B	Environmental Monitoring and Bio deterioration	2017	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to</p>

				<p>explore biological activities.</p> <p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight into biological processes.</p> <p>iv. Understood that the four propositions underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
5	AQC- 104A	Coastal Aquaculture	2017	<p>i. The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their</p>

				<p>structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p>
6.	AQC 104 B	: Ornamental Fish Culture	2017	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people</p>

				<p>of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
7.	Practical-1 AQC 105	Identification and Morphology of Cultivable Organisms	2017	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the ultra-structural information of animal cell besides the detailed views of the cell interior revealing the various events and actions of cell at the molecular level.</p> <p>iii. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the</p>

				<p>rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the principles of Graft rejection, Auto immunity and Antibody based therapy.</p>
8.	Practical-2 AQC106	Fish Nutrition	2017	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p> <p>ii. Students world gain expertise in understanding the complex molecular mechanisms occurring in cell and the applications of molecular technologies for betterment of life.</p> <p>iii. Understand and our apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the</p>

				health Professions.
9.	AQC 107	Human Values and Professional Ethics – I	2017	<p>i. Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they will also know the various tools and techniques related to bacterial microbiology.</p> <p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p>
10.	AQC 201	Principles of Aquaculture	2017	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes</p>

				<p>and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fullest.</p> <p>iii. Learn the fundamental principles of immune response including molecular, biochemical and cellular basis of immune homeostasis.</p> <p>iv. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.</p>
11	AQC 202	Physiology of Cultivable Organisms	2017	<p>i. In depth understanding of Anatomical features of Integumentary, Circulatory, Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.</p> <p>ii. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p>

				<p>iii. An appropriate understanding of functioning of each system of different groups of animals with their comparison will be acquainted.</p> <p>iii. Understanding of the basic concepts of Physiological regulation, from cellular to organ to organismal.</p> <p>iv. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet.</p>
12	AQC 203A	Fresh Water Aquaculture	2017	<p>i. Student will know the values of ethics in various fields including medical, social and business ethics.</p> <p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	AQC 203B	Capture fisheries	2017	<p>i. Students would gain expertise in explaining</p>

				<p>how a variety of interacting processes generate an organism's heterogeneous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p> <p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity complex and coordinated systems in organisms the students can apply this knowledge for research, and education, to solve the problems related to development in animals through research.</p>
14	AQC 204 A	Fishery Economics, Extension and Environmental Management	2017	<p>i. Students will be able to apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.</p> <p>ii. Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.</p> <p>iii. Students will be able to be proficient in</p>

				<p>ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p> <p>iv. Students will be able to use technology, such as geographical information systems and computer programming, to assist in problem solving.</p>
15	AQC 204 B	Limnology	2017	<p>i. Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological</p>

				<p>substances.</p> <p>iv. Students would gain basic knowledge of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study and understanding of life processes.</p>
16	Practical-1 AQC205	Soil and Water Characteristics	2017	<p>i. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to Education, Research and Extension programmes in his further career.</p> <p>ii. Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>iii. Students learn about enzymes. Their classification and nomenclature</p>

				<ul style="list-style-type: none"> iv. Students learn about specificity of enzymes v. Students learn about measurement of enzymatic activity vi. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.
17	Practical-2 AQC206	Physiology of Fin Fish and Shell Fish	2017	<ul style="list-style-type: none"> i. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances. ii. Identify and describe the different equipment and tools used in a biology laboratory. iii. Correctly operate different laboratory instruments. iv. Correctly operate different types of microscopes. v. Prepare tissue for section cutting and correctly operate a microtome.
18	AQC 206	Human Values and Professional Ethics – II (Audit course)	2017	<ul style="list-style-type: none"> i. Students gain knowledge about regulation of enzyme activity with respective mechanisms ii. To understand about mechanism of enzymes in clinical diagnosis and their applications

				<p>iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.</p>
19	AQC 301	Microbiology and Fish Pathology	2017	<p>i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology.</p> <p>ii. Describe different methods of data handling using computer.</p> <p>iii. Perform basic operations of gene sequence retrieval and compare them using different software.</p> <p>iv. Perform basic operations of protein structure retrieval and comparison using different software.</p> <p>v. The student will learn about the Computer basics like Operating systems, Programming, Data Access, Internet and Nucleic acid Sequence and Protein Data Banks.</p> <p>vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of</p>

				dispersion like Mean deviation and Standard deviation and Co-efficient of Variation. v. The course will aid in learning Test of significance like Null hypothesis and Alternative hypothesis, t-test, F-test, Chi-square test, Correlation and Regression analysis.
20	AQC 302	Fish Immunology	2017	i. Creating the self-employment opportunities to rural students through Animal husbandry, Aquaculture, Vermiculture and Sericulture. ii. To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices. iii. Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.
21	AQC: 303A	Cell Biology and Genetics	2017	i. To understand the different pathogens causing disease in man. ii. Describe the different parasites causing disease and disability in man and animals. iii. Ability to elaborate about the life cycle and biology of disease carrying vectors; suggest

				<p>preventive and control measures for the said diseases.</p> <p>iv. An understanding of the relationship between changes in physiology of host and</p> <p>v. The students after completion of the course based on the Expertise he/she may join as Parasitological Scientist.</p>
22	AQC 303 B	Bioinformatics In Aquaculture	2017	<p>i. Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment</p> <p>ii. Explain the importance of environmental audits and other management tools in business for social benefit by improving environmental performance</p> <p>iii. Calculate the carbon footprint of any organization and identify suitable mitigation strategies for carbon reduction solutions.</p>
23	Practical's AQC 304	Microbiology and Fish Diseases	2017	<p>i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials</p> <p>ii. Students learnt and gain knowledge on</p>

				<p>structure and function of different types of Synapses</p> <p>iii. Gained information on different types of Neurotransmitters i.e. Amino acids and Peptides.</p>
24	Skill oriented course AQC 305	Fish Nutrition Technology	2017	<p>i. The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research.</p> <p>ii. Understanding of the physiological and genotoxic effects of drugs and environmental toxins.</p> <p>iii. To understand various types of insecticides and understand their mode of action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible with other control strategies.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p>
25	Open	a)AQC 306A: Fish Processing	2017	<p>i. Learnt about structure, function and</p>

	Elective (For other department students)	Technology b) AQC306B: Pollution and Toxicology		<p>organization of Neurons in the Central nervous system</p> <p>ii. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials.</p> <p>iii. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny.</p> <p>iv. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effective communicate with both specialist and non-specialist audiences/community.</p>
26	AQC 401	Aquaculture Biotechnology	2017	<p>i. Skill development in environmental and occupational Toxicology.</p> <p>ii. It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain.</p>

				<p>iii. Identification of different routes of exposure of environmental toxins.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p> <p>v. To understand the overview of Animal Behavior and prominence of social organization in insects and primates.</p> <p>vi. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>vii. To understand how to conserve the wild animals</p>
27	AQC402	Essentials Of Biochemistry	2017	<p>i. Understanding of in vitro culturing of organisms and production of transgenic animals.</p> <p>ii. Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors.</p> <p>iii. This insight allows students to take into consideration about ethical issues involved in</p>

				<p>production of transgenic animals and BT products.</p> <p>iv. Use in gene transfer technology, genetic manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p> <p>v. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny</p> <p>vi. Classify the nutritional types of microorganisms and measure microbial growth</p> <p>vii. Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>viii. Assess impact of plant- microbe interaction on agriculture in both beneficial and detrimental ways. Identify industrially important microbes.</p>
28	AQC403A	Computer Applications, Information Technology And Biostatistics In Aquaculture	2017	i. Understand the overview of Animal Behavior and prominence of social organization in insects and primates

	AQC403B	Aquaculture Engineering		<p>ii. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>iii. To understand the how to conserve wild animals and management strategies.</p> <p>iv. To gain the knowledge about wild animals and animal products importance.</p>
29	Practical's AQC 404	Biotechnology And Biochemical Estimations	2017	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic pathways.</p> <p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
30	Multidisciplinary course/ project work	Project Work / Fieldwork	2017	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p>

	AQC405			<ul style="list-style-type: none"> ii. Students will be able to perform basic genetic engineering experiments at the end of course. iii. Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.
31	Open Elective (For other department students) AQC 406(A)	General Principles and Practices of Aquaculture	2017	<ul style="list-style-type: none"> i. Understand the evolution of protein structural motifs and domains and associate this with function; ii. Use on-line structural databases and tools to predict the properties, structure and function of proteins. iii. Understand and explain enzyme mechanisms in a structural context. iv. Describe mechanisms of protein folding and the roles of natively unstructured proteins in biology. v. Understand how cross-talk between proteins and post-translational protein modifications (e.g. phosphorylation, ubiquitination) facilitate information processing in cells.
32	AQC 406 (B)	Fish Breeding and Hatchery	2017	<ul style="list-style-type: none"> i. To understand the basic concepts of Infectious

		Management		<p>diseases and the role of immunity to control infections</p> <p>ii. Provides knowledge on the physiological mechanisms leading to diseased conditions.</p> <p>iii. Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv. This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>
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28. Geography

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcomes
1	GEG-101	Geomorphology	2017	<ul style="list-style-type: none"> • To understand the concept of place and how it is connected to people's sense of belonging to the physical environment, landscape and culture. • To understand the fundamental concepts of spatial interaction and diffusion, which explain how human activities are influenced by the concept of distance. • To exposed to the nature of physical systems such as geomorphologic processes and natural hazards. • To read and interpret information on different types of physical features maps. • To learn how human, physical and environmental components of the world interact.
2	GEG-102	Economic Resource Studies	2017	<ul style="list-style-type: none"> • To acquire knowledge about the concepts of resources, classification, models of natural resource processes, their use and misuse, conservation and management of resources for sustainable development • To Provide a comprehensive introduction to basic concepts and key theoretical approaches in economic geography • To Introduce economic geography as a dynamic, diverse and contested body of knowledge • To enable you to apply this knowledge to key social and economic issues

				in the context of economic globalization
3	GEG-103P	Maps Scales and Map Projections	2017	<ul style="list-style-type: none"> To apprise the students about the art and science of map making and representation. To explain the usage of different types of projections To focus on the importance of scale and projection in the process of representing the earth's surface
4	GEG-104P	Terrain Mapping Techniques	2017	<ul style="list-style-type: none"> To apprise the students about the Terrain mapping techniques To project the representation of the land forms by using contour lines To explain the methods of slope analysis To develop the knowledge on the thematic maps To Understand the data representation through the diagrammatic form and logographs
5	GEG-105	Advanced Cartography	2017	<ul style="list-style-type: none"> To apprise the students to various aspects cartography. To introduce the basic concepts and key theoretical approaches in Advanced Cartography. <p>To describes the art and science of map making and map analysis</p>
6.	GEG-106	Human Values and Professional Ethics-I	2017	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards</p>

				<p>people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society</p>
7.	GEG-201	Climatology and Oceanography	2017	<ul style="list-style-type: none"> • To introduce to the students the fundamentals of atmospheric phenomena, global climate systems and climate change. • The atmosphere and climate are a critical part of the earth system, and climatic variability and change are central to the issue of current and future global environmental change. • To grasp the techniques for modeling the climate, covering both theoretical and technical aspects. • To understand the dynamics of the atmosphere and the overall climatological system. • To be able to analyse and interpret climatic data and classification of climate
8.	GEG-202	Principles of Remote Sensing	2017	<ul style="list-style-type: none"> <input type="checkbox"/> To focus on history and evolution of Remote sensing. <input type="checkbox"/> To explain the principle involved in remote sensing i.e. the Electromagnetic spectrum, reflection, refraction, diffusion, absorption and interaction with the earth's atmosphere. <input type="checkbox"/> To give the technical knowledge of satellite system. <input type="checkbox"/> To provide knowledge on the platforms and instruments used for remote sensing. <input type="checkbox"/> To give light on Aerial Remote sensing and satellite Remote sensing. <p>To explain about the specifications of sensors</p>

9.	GEG-203P	Interpretation of topographical and Weather Maps	2017	<ul style="list-style-type: none"> • To provide understanding and interpretation Skills of different Topographical maps. • To improve the knowledge on Indian weather maps and Interpretation skills.
10	GEG-204P	Techniques of Mapping and Map Analysis	2017	<ul style="list-style-type: none"> • To apprise the students about the Terrain mapping techniques • To project the representation of the landforms by using contour lines • To explain the methods of slope analysis • To develop the knowledge on the thematic maps
11	GEG-205	Geographical Thought	2017	<ul style="list-style-type: none"> • To acquaint the students with the Geographical philosophy and the Methodology and historical development of geography as a professional field. • The idea is to address the spirit and purpose of the changing geographies and to what we as geographers contribute towards knowledge production. • To developing critical thinking and analytical approaches and Students will acquire an understanding of and appreciation for the contributions of the eminent geographers to the subject.
12	GEG-206	Human Values and Professional	2017	Student will know the values of ethics in various fields including medical, social and business ethics.

		Ethics-II		<p>ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>iii. Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.</p>
13	GEG-301	Urban Studies	2017	<ul style="list-style-type: none"> • To deal with the concept of urban settlements and evolution of urban population and to provide concept of Urban studies. • To explain the cause and effects of growth in urban population. • To explain the theories involved in classifications of towns and relationship between towns and cities and their population. • To understand patterns of World urbanization with reference to India
14	GEG-302	Geographical Information System (G.I.S)	2017	<ul style="list-style-type: none"> • To understand the evolution of GIS. • To focus on collection, analyzing, interpretation and presenting the data related to Earth. • To explain the types of data collection with respect to time and terrain and Database management and retrieving the data from different sources. • To provide the theoretical knowledge on the Modeling surfaces and integration of Remote sensing with GIS. • To provide knowledge on GIS applications in different sectors.

15	GEG-303P	Geographical Information System(G.I.S)	2017	<ul style="list-style-type: none"> • ToacquaintknowledgetheaboutespeciallyGeographicInformatio nSystem(GIS)softwares. • .Todeveloptheskillofgeo-referencingandcreationofdifferentdatafiles. • Toimprovethepracticalknowledgeonattributedataandlinkage. • TodeveloptheskillonanalysismethodsofGIS.
16	GEG-304P	Statistical Techniques	2017	To analyze and represent the geographical data
17	GEG-305A	Agricultural Studies	2017	<ul style="list-style-type: none"> • TofocusonevolutionofAgriculturethroughatthedifferentagesandapproaches. • Tounderstandtheconceptsandimportanceofdeterminantsindifferentcroppingpatte rns. <p>To understand agricultural allocation theories also the problem and prospectsof Indian Agriculture</p>
18	GEG-305B	Regional Geography of India with special reference to Andhra Pradesh		<ul style="list-style-type: none"> <input type="checkbox"/> TodeveloptheunderstandingaboutphysicalfeaturesofIndianGeography. <input type="checkbox"/> Tofamiliarizethestudentswithphysiography,Drainage,Climate,soilandnatur alvegetationofIndia.
19	GEG-305C	Disaster Management	2017	<ul style="list-style-type: none"> <input type="checkbox"/> Todeveloptheskillofunderstandingaboutnaturalcalamitiesanddisasterandals orealizetheconsequencesaswellaspreparedness.

		Studies		<input type="checkbox"/> To create awareness on human and natural disasters <input type="checkbox"/> To understand classification of disasters and its impacts
20	GEG-306A	Regional Geography of Andhra Pradesh	2017	<ul style="list-style-type: none"> • To acquaint the students with re-organization of Andhra Pradesh and its new physical, climate and drainage aspects.. • To obtain the knowledge of demographic, irrigation and major crops. • To understand Andhra Pradesh mineral and industrial aspects with transportation. • To improve knowledge on the transportation and communication aspects of Andhra Pradesh
21	GEG-306B	Geographical information System (GIS) and Global Positioning System (GPS) applications	2017	<ul style="list-style-type: none"> • To develop the skill of understanding GPS and Survey. • To create awareness on post processing of GPS data and collection of data from GPS survey. • To develop skill of report writing by using GPS data and software and hardware To acquaint knowledge about especially Geographic Information System (GIS) soft wares. • To develop the skill of geo-referencing and creation of different data files. • To improve the practical knowledge on attributed data and linkage. • To develop the skill on analysis methods of GIS.

22	GEG-401	Regional Planning	2017	<ul style="list-style-type: none"> <input type="checkbox"/> To apprise the concept of Region and its planning. <input type="checkbox"/> To explain the types of regions and regional hierarchy. <input type="checkbox"/> To explain the types of regional planning and planning process. <input type="checkbox"/> To the people participation in planning process and role of Panchayat Raj system <input type="checkbox"/> To explain the resource based and physiographic based regional planning.
23	GEG-402	Advanced Remote Sensing	2017	<ul style="list-style-type: none"> • To give broad knowledge on photogrammetry, Principle, process, platforms and techniques and Aerial photographs. • To provide knowledge on software and hardware required for digital image processing, image enhancement and restoration techniques. • To understand the application of remote Sensing and Photogrammetry in various fields of study.
24	GEG-403P	Research Techniques	2017	<ul style="list-style-type: none"> • To provide an understanding for the student on statistical concepts to include measurements of location and dispersion, and correlation analysis. • To calculate and apply measures of location and measures of dispersion-- grouped and ungrouped data cases. <p>To sensitize the different Research and agricultural techniques</p>
25	GEG-404P	Remote Sensing Applications	2017	<ul style="list-style-type: none"> <input type="checkbox"/> To explain practical knowledge on Remote sensing applications... <input type="checkbox"/> To help to understand Visual and digital interpretation of satellite Images. <input type="checkbox"/> To illustrate interpretation of Aerial photos.

				ToacquaintknowledgeonallocationofRSindifferentfieldsandsectors
26	GEG-405A	Water and Soil Resource Management	2017	<ul style="list-style-type: none"> • Toapprisethestudentstovariouswaterresourcesrelatedaspectsandhydrologicalcycle • Tofocusongroundwaterandsoilspecifications. <p>To develop skill of water and soil management and to study on some case studies</p>
27	GEG-405B	Environmental Studies	2017	<ul style="list-style-type: none"> • Tocreatetheenvironmentalaptitudeamongstudents. • Tofamiliarizethestudentswithconcepts,issues,approachesaboutphysicalland • Toacquaintedwithcontemporaryenvironmentalproblemsandchallenges. <p>To provide knowledge on Ecosystem, Biomes, food chain and hydrological cycle</p>
28	GEG-405C	Geography for Research Extension and industry	2017	<ul style="list-style-type: none"> <input type="checkbox"/> Toexplainthehistoricalevolution,ofresearchinGeographicalstudies. <input type="checkbox"/> Tohelptounderstandaboutethics,methodsandfactorsingeographicalresearch. <input type="checkbox"/> Toprovidetheknowledgeaboutformsofresearchanddesign. <input type="checkbox"/> Toillustrateresearchmethodsanddatacollection. <p>Toacquaintresearchanalysisandreportwriting</p>
29	GEG-406A	Regional Geography of India	2017	<ul style="list-style-type: none"> • ToconceptualizetheregionalapproachesandtoexamineregionaldifferentiationinthestudyofIndianGeography. • Toexposetohistorical,economic,cultural,socialandphysicalcharacteristicsofIndia. <p>To provide an introduction to the regions of the India in terms of both their uniqueness and similarities</p>

30	GEG-406B	Remote sensing Principles and Applications	2017	<input type="checkbox"/> To explain practical knowledge on Remote sensing applications... <input type="checkbox"/> To help to understand Visual and digital interpretation of satellite Images. <input type="checkbox"/> To illustrate interpretation of Aerial photos.
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29. Geology

S. No.	Course Code	Title of the Course	Years of Introduction	Course outcomes.
1	GEO-101	Geomorphology and Paleontology	2017	<p>1) Able to explain conceptual approaches in geomorphology.</p> <p>2) Able to describe land forms and land forming processes in different climate zones and tectonic regimes.</p> <p>3) Able to explain different theories and models for landscape evolution.</p> <p>4) Obtain knowledge in recognizing and minimizing the mass wasting.</p> <p>5) Able to apply geomorphological concepts in economically important projects.</p> <p>6) <i>Palaeontology</i> is the study of prehistoric species, mostly ones that are extinct. It focuses primarily on fossil data, using a variety of physical, chemical and biological.</p> <p>7) Paleontology has essentially three basic goals: (1) to describe the world's past biodiversity; (2) to outline the history of life on earth; and (3) to develop</p>

				new ideas about evolution and ecology.
2	GEO-102	Crystallography & Mineralogy	2017	<ol style="list-style-type: none"> 1) Students will be able to describe crystal structures, crystal symmetry and twinning 2) Students will learn the use of X-ray crystallography to determine the arrangement Atoms in a crystal. 3) Students will be able to identify the mineralogical composition of geological materials by studying some of the optical properties and techniques in order to reveal their origin and evolution. 4) Students will get thorough knowledge about the physical chemical and optical Characteristics of minerals could lead to the discovery of new uses for Earth's mineral resources.
3	GEO-103P	Crystallography & Mineralogy	2017	<ol style="list-style-type: none"> 1. The student understands the importance of minerals to society and to the study of the Earth. 2. Can explain how the properties of chemical elements and their bonds regulate the structure and composition of minerals. 3. Demonstrate how the crystal structure of minerals affects the external morphology and physical properties of a mineral (e.g. crystal symmetry, crystal habit). 4. Identify various minerals using Physical properties. 5. Identify various crystal forms shown by minerals belonging to different crystal system.
4	GEO-104P	Geomorphology	2017	<ol style="list-style-type: none"> 1) The practical application of geomorphological science now forms river

		& Paleontology		<p>restoration and environmental protection.</p> <p>2) the extensive experience gained through field work, analysis and input to the design process to provide thorough understanding of geomorphology in the river environment and describe</p> <p>3) Paleontology is highly relevant to the modern and future world. We can learn how climate change has effected past organisms as well as how organisms have changed the physical world. We can also better understand the principles of extinction, evolutionary change, and biodiversity.</p> <p>4) Paleontological resources, or fossils, are any evidence of past life preserved in geologic context. They are a tangible connection to life, landscapes, and climates of the past. They show us how life, landscapes, and climate have changed over time and how living things responded to those changes.</p> <p>5) Paleontology lies between biology and geology since it focuses on the record of past life, but its main source of evidence is fossils in rocks.</p> <p>6) paleontology, also spelled paleontology, scientific study of life of the geologic past that involves the analysis of plant and animal fossils, including those of microscopic size, preserved in rocks.</p> <p>7) Body fossils and trace fossils are the principal types of evidence about ancient life, and geochemical evidence has helped to decipher the evolution of life.</p>
5	GEO-105	Stratigraphy & Paleontology	2017	1) Students would have acquired comprehensive knowledge on principles of Stratigraphy, correlation methods classification of Stratigraphy units, tectonic

				<p>framework of India and Geological timescale.</p> <p>2) Ability to give an account of various stratigraphic units and give stratigraphic column distribution in India, fossil content and economic importance of given geological formation.</p> <p>3) Apply standard stratigraphic codes while preparing geological reports</p> <p>4) Describe morphology, classification, evolutionary trends of Invertebrate fossils with geological and geographic distribution and paleoecological and paleo-environmental relevance.</p> <p>5) Ability to identify, classify and describe the morphology of the invertebrate fossils and plant fossils.</p> <p>6) Application of fossils in establishing the age of the rockunit, correlation with other area, and Use of fossil in finding mineral deposits.</p> <p>7) Ability to apply micropalaeotological techniques in hydrocarbon exploration.</p>
6.	GEO-106	Human Values & Professional Ethics-I	2017	<p>1) After completion of this course the students will be able to know the importance of Ethics and Human Values in various professions.</p> <p>2) Students also will get in depth knowledge and understanding of moral values and ethical code of the Indian Society. Especially embedded in various scriptures.</p>
7.	GEO-201	Structural Geology and Geotectonics	2017	<p>1) Able to demonstrate a basic understanding of stress, strain, rheology of earth's lithosphere and comprehend how to describe and classify brittle and ductile structures.</p>

				<p>2) Able to describe, identify and analyze the folds, faults and joints and their effects on outcrop pattern.</p> <p>3) Measure, plot and interpret structural field data and can relate these to geological Maps and knows how to read geological maps and geological cross-section.</p> <p>4) Obtain knowledge of shear zone characteristics and textures which are usually highly, Mineralized zones.</p>
8.	GEO-202	Remote Sensing and GIS	2017	<p>1) Develop knowledge in basics of Remote Sensing interpretation keys and applications.</p> <p>2) Formulate the relationship between EMR and satellite Remote Sensing.</p> <p>3) Application for Remote Sensing for important economic deposits.</p> <p>4) Operate GIS data model and demonstrate GIS techniques for various applications.</p> <p>5) Apply RS and GIS techniques to analyze the various geological materials.</p>
9.	GEO-203P	Structural Geology & Sedimentology	2017	<p>1) The interpretation of geological maps and determination of strike and dip, Borehole problems and apparent dip, plunge and pitch of linear structures</p> <p>2) Structural geology concepts and tools to understand rocks deformation in hot environments</p> <p>3) Structural geology with interpretations and simple geomechanical problems and solutions</p> <p>4) Structural geology issues related to new instruments in measuring structural data from rocks, paleomagnetic studies in tectonics field studies in</p>

				<p>structural geology interdisciplinary aspects of structural geology.</p> <p>5) Sedimentology encompasses the study of modern sediments such as sand, silt, and clay, and the processes that result in their formation (erosion and weathering), transport, deposition and diagenesis.</p> <p>6) Sedimentology, the study of sedimentary rocks and the processes by which they are formed, includes and is related to a large number of phenomena.</p> <p>7) Sedimentology includes the five fundamental processes defined by the term sedimentation --weathering, erosion, transportation, deposition and diagenesis.</p>
10.	GEO-204P	Remote Sensing and GIS	2017	<ol style="list-style-type: none"> 1. Understand the concepts of Photogrametry and compute the heights of objects 2. Understand the principles of aerial and satellite remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies. 3. Understand the basic concept of GIS and its applications, know different types of data representation in GIS. 4. Understand and Develop models for GIS spatial Analysis and will be able to know what the questions that GIS can answer are. 5. Apply knowledge of GIS software and able to work with GIS software in various application fields. 6. Illustrate spatial and non spatial data features in GIS and understand the map projections and coordinates systems.

				7. Apply knowledge of GIS and understand the integration of Remote Sensing and GIS.
11	GEO-205	Sedimentology	2017	<p>1) Able to identify different sedimentary rocks in both hand specimens and thin section and derive information on the depositional conditions and environments.</p> <p>2) Able to study the sequence of sedimentary rock strata and describe the tectonic framework of sedimentation to understand the earth's history including palaeoclimatology and history of life</p>
12	GEO-206	Human Values & Professional Ethics-II	2017	<p>1) After completion of this course the students will be able to follow and practice good behaviour with human values and moral support to their elderly family members.</p> <p>2) They also aware and get knowledge about medical ethics how the doctors will behave with patients, what type of ethics should be followed by business people. They also get in through knowledge about the protection of environment social ethics like family ethics, the role of print and electronic media in prevention and protection of Human rights in Indian society.</p>
13	GEO-301	Igneous Petrology	2017	<p>1) Acquire knowledge on the evolution of magma by different processes takes place from origin to emplacement with respect to different tectonic settings.</p> <p>2) Explain Igneous processes, formation, structures, classification and significance of texture in explaining rock history.</p> <p>3) Obtain knowledge on the crystallizing phase equilibrium of multi</p>

				<p>component magma system.</p> <p>4) Identify different Igneous rocks both in handspecimens and thin sections in terms of their petrogenesis by studying the petrographic characteristics.</p>
14	GEO-302	Metamorphic Petrology	2017	<p>1) This course has links directly with industry and share the knowledge about a wide range of ore deposits.</p> <p>2) Offers a detailed study of origin of economic mineral deposits its identification properties and distribution in India.</p> <p>3) Comprehensive knowledge in reflection light optic and ore textures.</p>
15	GEO-303P	Petrology	2017	<p>1) Describe the types and relative abundances of phases in a rock based on observations from hand specimens and thin sections</p> <p>2) Interpret the geologic history of igneous rocks based on mineral assemblage and textures using both hand sample and microscope techniques</p> <p>3) Use metamorphic mineral assemblages and textures to constrain deformation history and P-T conditions</p> <p>4) Use geochemical data (partition coefficients, REE plots, etc) to constrain petrogenetic processes</p> <p>5) Integrate their research findings with those of peers in developing a consensus model that (a) explains mineral occurrences and interplay (micro- and macroscopic) in field samples, and (b) holds up to public scrutiny (as a consensus model and as individual components) at a</p>

				<p>departmental mini-poster symposium</p> <p>6) Design and implement a field sampling campaign</p> <p>7) Use a portable X-Ray Fluorescence Spectrometer to collect elemental analyses</p> <p>8) Use MS Excel to organize, plot, and evaluate the petrogenesis of CRB using elemental data</p>
16	GEO-304P	Geochemistry	2017	<p>1) Geochemistry can play a key role in helping to protect the safety of drinking water by identifying the sources, concentration and forms of potentially harmful elements such as arsenic mercury and fluoride in natural water.</p> <p>2) Geochemistry and health establishes and explains links between the natural or disturbed chemical composition of the earth's surface and the health of plants animals and people.</p>
17	GEO-305	Geochemistry and Thermodynamics	2017	<p>1) Understand the behavior of elements in a geochemical context and relate this knowledge to how elements redistribute within the Earth.</p> <p>2) Learn to interpret and explain interactions between Earth reservoirs.</p> <p>3) Understand and interpret the major processes that form and modify the Earth's crust and mantle.</p> <p>4) Use isotopes to trace geological processes and age date specific events.</p>
18	GEO-306	Computer Applications and	2017	<p>1) Comprehend the database related to field geological data</p> <p>2) Prepare and Interpret graphical and pictorial data</p>

		Geostatistics		3) Exposure to some selected software's related to geology
19	GEO-307	Dimensional Stones and Building Materials	2017	1) Explain the distribution of dimensional stones and occurrence of construction materials 2) Classify dimensional stones and construction materials 3) Assess the suitability of various dimensional stones and construction materials
20	GEO-308	Gemology	2017	1) The course is focused on a comprehensive learning in gemology 2) Understands the formation, classification and properties to final the grading and evaluation. 3) Knowledge in order to identify original gemstones and stimulants 4) Acquire skills which will be useful to them in gem industry
21	GEO-309	Surveying and Field Geology	2017	1) Understand the use of different surveying instruments, field equipment, aerial photographs and their use. 2) Compute the area and earthwork for different works by using surveying instruments 3) Analyze surveying techniques, tools, survey data and geological reports 4) Prepare contour maps, geological maps and reports 5) Solve survey issues using proper survey and interpretation. 6) Use appropriate modern tools in surveying and mapping
22	GEO-401	Economic Geology	2017	1) Its chief objective is to guide the exploration for mineral resources and help determine which deposits are economically worthwhile to mine. Specialists in economic geology often assist in the extraction of the mineral commodities

				<p>as well.</p> <p>2) <i>Economic geology</i> is concerned with earth materials that can be used for economic and/or industrial purposes. These materials include precious and base...</p> <p>3) Scientific discipline concerned with the distribution of mineral deposits, the economic considerations involved in their recovery, and an assessment of the reserves available.</p> <p>4) Economic geology deals with metal ores, fossil fuels (<i>e.g.</i>, petroleum, natural gas, and coal), and other materials of commercial value, such as salt, gypsum, and building stone. It applies the principles and methods of various other fields of the geologic sciences, most notably geophysics, structural geology, and Stratigraphy . Its chief objective is to guide the exploration for mineral resources and help determine which deposits are economically worthwhile to mine. Specialists in economic geology often assist in the extraction of the mineral commodities as well.</p>
23	GEO-402	Mineral Exploration, Mining & Engineering Geology	2017	<p>1) This course linked to industry and acquires knowledge on techniques to locate ore bodies, methods for mineral exploration and geologic aspects of drilling.</p> <p>2) Acquire knowledge on geophysical methods for Ore reserve estimation.</p> <p>3) Acquire knowledge on Ore beneficiation processes and techniques.</p> <p>4) Confirm mining rules and regulations</p>

				<p>5) Able to determine the suitable mining methods</p> <p>6) Analyse different ores and ore beneficiation processes.</p> <p>7) Understand the different engineering properties of rock types and role of geologists in selecting the sites for different major engineering projects.</p>
24	GEO-403P	Economic Geology	2017	<p>1) This course has links directly with industry and share the knowledge about a wide range of ore deposits.</p> <p>2) Offers a detailed study of origin of economic mineral deposits its identification properties and distribution in India.</p> <p>3) Comprehensive knowledge in reflection light optic and ore textures.</p> <p>4) Acquire practical knowledge on microchemical techniques for identification ores and estimation of ore reserves.</p>
25	GEO-404P	Project Work	2017	<p>Mining is global industry, which provides the raw material and energy resources needed to sustain modern civilization.</p> <p>Demands for mineral consumptions are increasing day to day drastically and also expected to increase in decades to a head of population growth and rising and living standards.</p> <p>Environmental awareness in relating to proper protective and mitigation measures to the environment from its damage as soon as a great amount of improvement in mining sector</p>
26	GEO-405	Hydrogeology	2017	<p>1) Apply the knowledge of geological formations and the hydrological</p>

				<p>properties of rocks</p> <p>2) Analyze the suitability of water for domestic, irrigation and industrial purposes Conduct geological and geophysical investigations and give recommendations for drilling of borewells.</p> <p>3) Explain causes of pollution of groundwater give remedial measures to the society.</p> <p>4) Use modern methods and appropriate techniques to carrying out geophysical studies and artificial recharge methods</p> <p>5) Students will get critical knowledge on evaluation of geological condition at the major engineering project sites.</p>
27	GEO-406	Environmental Geology & Natural Hazards	2017	<p>1) Explain different aspects of environment and local, regional and global environmental problems.</p> <p>2) Classify and explain the environmental pollution and disaster control technologies</p> <p>3) Prepare, interpret and implement environment projects</p> <p>4) Identify the natural and environmental disasters, its causes and apply preventive measures.</p> <p>5) Adoptthe laws and regulations towards hazard management</p> <p>6) Able to prepare controls of mitigating toward natural disasters.</p>
28	GEO-407	Water Shed Management	2017	<p>1) Explain the importance of watershed management</p> <p>2) Classify and explain the different water harvesting techniques</p> <p>3) Use modern tools for land erosion control</p>

				4) Develop or improve the people's participatory approach for sustainable development and management of watersheds.
29	GEO-408	Medical Geology	2017	1) Explain about relationship of human Health and Geological Processes. 2) Able to understand the importance of the Water quality standards and impact of micronutrient deficiencies in soils and crops on human health 3) Analyse the interaction of abundance of elements and geological effects.
30	GEO-409	Fuel Geology	2017	1)Thecourseoffersadetailedstudyaboutnaturalfuelslikecoalandpetroleumtheirformation and distribution especiallyin sedimentarybasins. 2)Studentsshallbenefittohavebasicideasaboutformations,nomenclatureinconstitution of coal working detail of distribution of coals and coal industry in India, Sufficient idea of formationand entrapment of oil and gas. 3)Get elaborate knowledge about occurrence of atomic minerals in nature, methods of prospecting, atomic fuels and environment.

Food Science Nutrition & Dietetics

S.No	Course Code	Title of the Course	Year of Introduction	Course Outcomes
1	FSND 101	Food Chemistry and Analysis	2017	<p>Knowledge on chemical composition physical, chemical, and functional properties of Water, carbohydrate, Protein and Fats.</p> <p>Understand the principles and working applications of different analytical techniques associated with food.</p> <p>skills in qualitative and quantitative estimation of nutrients in different foods.</p> <p>This course gives on hands on experience which will help student to become food analyst at local, regional, national and global levels.</p>
2	FSND 102	Food Science and Experimental Foods	2017	<p>This course will give knowledge on Plant and Animal foods composition, and processing techniques on nutritive quality of foods.</p> <p>Understand the principles of cookery of different foods and methods of evaluation.</p> <p>This course is prerequisite for skill development in Food Product development.</p> <p>Standardization and experimentation on different foods leading to physical, chemical and sensory changes can be understood leading to become food research analyst in industries at local, regional, national levels.</p>
3	FSND 103	Clinical Nutrition and	2017	The concepts of nutrition and its relation to health and describe the role and

		Dietetics-I		<p>responsibilities of Dietitian in Hospital will be dealt.</p> <p>Knowledge related to Therapeutic modification of diets and Plan and prepare diet for different diseases conditions.</p> <p>This will help the students to get employability in hospitals and also start their own diet and nutrition clinics.</p>
4	FSND 104	Food Chemistry and Analysis Practical	2017	<p>Developing skills in quantitative and qualitative analysis of Nutrients in foods.</p> <p>This course will help the students to develop skills as food analyst for employability.</p>
5	FSND 105	Food Science and Experimental Foods Practical	2017	<p>Standardization of foods using different processing techniques is included along with skills in processing, preparation and evaluation of bakery products.</p> <p>This helps in employability and entrepreneurial opportunities for the students</p>
6	FSND 106	Clinical Nutrition and Dietetics-I Practical	2017	<p>This course gives hands on experience in Therapeutic modifications of diet for different diseases by planning, preparing and evaluating.</p>
7	FSND 107	Essential of Food and Community Nutrition	2017	<p>Nutrients in food, their functions and consequences of deficiency is included in this course.</p> <p>Developing skills for planning diets for nutritional disorders like PEM, Iron, Vitamin A and Iodine and the knowledge of techniques to assess the nutritional status of different age groups.</p> <p>Acquire knowledge on government programs to prevent nutritional</p>

				<p>disorders according to regional and national needs.</p> <p>Community assessment skills in terms of anthropometry, dietary, clinical and biochemical for various disorders and planning programs for important days is given along with</p> <p>Applications of Computational skills in the Nutritional allowances during life span.</p>
8	FSND 108	Human Values and Professional Ethics-I	2017	The students understand the importance of good character, conduct and values embedded in various religions. Demonstrate knowledge of ethical values in non-class room activities, internships and field work.
9	FSND-201	Nutritional Bio chemistry	2017	<p>This course deals with the metabolism of nutrients such as carbohydrates, proteins, lipids, minerals and vitamins in human physiology acquire knowledge on factors affecting digestion, absorption of nutrients.</p> <p>Create awareness on enzymes and its role in nutrient metabolism and gain knowledge on role of vitamins and minerals as coenzymes in metabolism.</p>
10	FSND-202	Food Microbiology and Safety	2017	<p>Knowledge acquirement about important genera of microorganisms associated with food.</p> <p>This course makes the student to acquaint with the various factors associated with growth, food spoilage and food-borne diseases of different microorganisms and food contaminants and their sources.</p> <p>Gain knowledge on the characteristics of food borne diseases, infections and intoxications and their identification and make the students to fit in as food microbiologist at national level.</p>

11	FSND-203	Clinical Nutrition and Dietetics-II	2017	<p>The concepts of dietary principles for various diseases and comprehend knowledge in Dietary modifications for the management of diseases is included in the course.</p> <p>Application of principals in preparation and service of diets to the patients and assess the case studies and construct the diet charts will be explained.</p> <p>This course will be helpful in creating employability and entrepreneurship at local and national levels.</p>
12	FSND-204	Nutritional Biochemistry Practical	2017	<p>Developing skill and hands on experience in analysis of biochemical parameters in blood and serum will be carried out in this course.</p>
13	FSND-205	Food Microbiology and Safety Practical	2017	<p>Standard methods and procedures for the microbiological analysis of food will be dealt in this course to have skill development and employability in food industries at local, regional and national level.</p>
14	FSND-206	Clinical Nutrition and Dietetics-II Practical	2017	<p>Application of principals in preparation and service of diets to the patients and assess the case studies and construct the diet charts will be explained.</p> <p>This course will be helpful in creating employability and entrepreneurship.</p>
15	FSND-207	Research Methodology	2017	<p>The concept of doing research and terms like ‘variables’, ‘hypotheses, and ‘research ‘and different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research are dealt in this course.</p> <p>This course helps student to critically gain knowledge to select a sample by using different sampling methods like probability and non-probability</p>

				<p>sampling.</p> <p>Develop a research proposal in the appropriate scientific style to help students for skill development for higher learning.</p> <p>This course makes the student to understand about the scope of statistics in research, concepts of inferential statistics like t-test, chi-square, Correlation and Variance.</p> <p>Basics in computer and its application in statistics and development of skill in computing statistics by using statistical software will be imparted.</p>
16	FSND-208	Human Values and Professional Ethics-II	2017	<p>Understand the importance of value education and ethics in medical, business, environmental and social fields. The students apply the knowledge while joining in any profession and will contribute to society as socially responsible citizens.</p>
17	FSND 301	Food Processing and Preservation Technology	2017	<p>The course illustrates the principles and scope of food processing and preservation along with various techniques/methods.</p> <p>Knowledge acquirement on advanced emerging technologies and their applications in food processing and preservation is imparted to the students.</p> <p>This course creates opportunities in local, regional, national levels.</p>
18	FSND 302	Advances in Human Nutrition	2017	<p>The course appraises the advance concepts of nutrition of Brain, Immunity and Sports along with the concepts of dietary management in endemic nutrition problems.</p> <p>This course create knowledge on the dietary management during emergencies and the process and relation of immunity and nutrition.</p>

19	FSND - 303	Rural Work Experience	2017	This course will help students to gain skill and have hands on experience in assessing a community in relation to nutrition, human development and extension activities.
20	FSND-304	Internship	2017	Internship as dietitian in government and corporate hospitals give practitioner skills and hands on experience for entry-level dietitians who are able to assume leadership roles to improve and maintain the nutritional care of diverse individuals, families and communities within national and global populations.
21	FSND- 305	(a) Nutrition Research Techniques (b)Geriatric Nutrition (c)Nutrition in Emergencies and Disaster	2017	(a). Understanding the methods of nutritional status assessment like Anthropometry, Biochemical, Clinical and Dietary will be dealt in this course. Application of knowledge on assessment techniques of protein quality in diets and Plan nutrition research using animal models is given in this course along with designing in nutrition research using Human models. (b). Understanding the physiological changes and theories of ageing and gaining knowledge on importance and consequences of diet in elderly is included in this course. Creating awareness on degenerative diseases, life style genesis and its management through diet and acquainting with the government programs and policies for elderly is included. (c). This course helps to assess the emergency situations related to food and Nutrition in natural and manmade disasters and nutrition surveillance and

				treatment in emergencies.
22	FSND- 306	(a) Fundamentals of Food, Nutrition and Health (b) Nutritional Assessment	2017	(a) The course will help students to gain knowledge on foods, food groups, balanced diet for different age groups and understand the importance of macro and micronutrients in daily diet. Comprehending knowledge on deficiency symptoms of different nutrients and developing skills and hands on experience to assess nutritional problems in community is included in the course. (b) Understanding the methods of nutritional status assessment like Anthropometry, Biochemical, Clinical and Dietary will be dealt in this course. Application of knowledge on assessment techniques of protein quality in diets and Plan nutrition research using animal models is given in this course along with designing in nutrition research using Human models.
23	FSND 401	Food Safety Standards and Quality Control	2017	This course includes the current food safety standards rules and regulations and gain knowledge on desirable and undesirable constituents and contaminants in foods. This course helps students to critical analysis on subjective and objective methods of quality of food and develop skills for quality analysis and assurance of food at national level.
24	FSND 402	Food Product Development and Marketing	2017	This course illustrates the new product categories in food market and their characteristics and elucidate the process of new food product development in food industry.

				Exemplifying various specialty food products and their applications and acquiring the skill to design and development of new food product and analyzing the quality of the product is imparted.
25	FSND-403	Nutrition for Health and Fitness/ Dissertation	2017	The course defines the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation. Energy metabolism pathways during physical activity and describing the role of macronutrients in physical performance, weight management and obesity has been included. This course also explains the nutritional needs in different sports and the role of national agencies, thereby creating employability in Nutrition fitness centers at local, regional and national levels.
26	FSND-404	Food Safety Standards and Product Development Practical's	2017	This course helps students to critically analyse subjective and objective methods of quality of food and develop skills for quality analysis and assurance of food. Skill to design and development of new food product and analyzing the quality of the product is imparted thereby employability in national organizations like FSSAI.
27	FSND-405	(a) Institutional Food Service Management (b) Baking Technology	2017	(a) The course will gain knowledge on the different types and management of food services and exposure to the dietary department in a hospital setting. Knowledge on finance, personnel management, duties and responsibilities of dietitians will be learnt. (b) Gaining skills to act in a variety of capacities in clinical, administrative,

		(c) Food Packaging		<p>and community settings and quantitative food production and planning diet plans for different diseases by placing in hospitals is practiced.</p> <p>(c) This course provide knowledge on packaging and packaging materials an overview of the scientific and technical aspects of food packaging. Enabling the students to understand the regulations of packaging and packaging material testing and applying skills of new innovations in food packaging to improve product stability and/or to extend the product shelf-life was included.</p>
28	FSND-406	<p>(a) Child Welfare Programmes</p> <p>(b) Disaster Management</p>	2017	<p>(a) The course helps the students to know the terms growth, development and stages of development across life span and understand the characteristics of children at different stages of childhood</p> <p>Explaining the different developments like physical, cognitive, language and social development during childhood and applying knowledge to understand normal development and developmental delays during childhood is studied.</p> <p>(b). The course helps to know about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management and to understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters.</p> <p>Explaining the efforts made by the NGOs, Community based organizations</p>

				and local administration in disaster management will be dealt in the course.
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Human Development and Child Welfare

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1.	HDCW-101	Advanced Study of Child Development	2017	Students acquire the knowledge of holistic development of individuals from conception to adolescent period. The students can disseminate the knowledge to teachers and parents regarding normal and delayed development among children. The students can apply skills when they serve as teachers at local level or as extension officers in national schemes like ICDS.
2.	HDCW-102	Community Nutrition	2017	Students acquire knowledge about food groups, RDA and steps in planning a diet. The skills learnt in planning and calculation of nutritive values help when they work in local hospitals or in National programs like Zero budget natural forming , ICDS etc.
3.	HDCW-103	Trends in Early Childhood Education	2017	Students apply knowledge about appropriate approaches to teach pre- school children. They apply skills in the field of early childhood education, when they are placed as pre -school teachers at local level and as pre- school trainers at national level in Government organizations like ICDS or NGOs like Azim Premji foundation, PRATHAM, Bachpan etc.
4.	HDCW-104	Practical-I Developmental		Students acquire skills on apply skills of observation of recording of all round development among infant and children below 5 years. They learnt how to

		Assessment Practical		assess cognitive ,physical, social &emotional development of children from late childhood to adolescent period, and life skills among adolescents.. The students can apply skills when they as teachers at local level or as extension officers in national schemes like ICDS.
5.	HDCW-105	Practical-II Community Nutrition Practical	2017	Students apply skills related to food groups, RDA and steps in planning a diet. The skills learnt in planning and calculation of nutritive values help when they work in local hospitals or in National programs like Zero budget natural forming , ICDS etc.
6.	HDCW-106	Practical-III Early Childhood Education Practical	2017	Students apply skills in the field of early childhood education, when they are placed as pre-school teachers at local level and as pre- school trainers at national level in Government organizations like ICDS or NGOs like Azim Premji foundation, PRATHAM, Bachpan etc.
7.	HDCW-107	Family Dynamics	2017	Students will get knowledge related to issues in family and society and understand laws related to marriage and family . Students utilize this knowledge when they work in national organizations like social welfare board and family counseling centers and in non-government organizations catering to the family welfare at local level like PASS ,RASS etc..
8.	HDCW-108	Human Values and Professional Ethics- I	2017	Students understand the importance of good character , conduct and values embedded in various religions . Demonstrate knowledge of ethical values in non-class room activities, internships and field work.
9.	HDCW-201	Quality Standards in ECE Centers	2017	Students will get knowledge about planning activities for pre-school children .They understand different ways of teaching stories ,rhymes etc using different

				audio-visual aids.apply skills in planning a day's activities for pre -school children , prepare Teaching Learning Material (TLM) and participate as student teacher in SVU Laboratory nursery school. The practical experience helps in establishing preschools, as entrepreneurs also to serve in Non Government institutions like Azim Premji Foundation, PRATHAM at national level and in Government sectors as extension officer at National level programs that are providing pre- school education
10.	HDCW -202	Child Study Techniques	2017	Students are capable to use standardized techniques for assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS ,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital.
11.	HDCW -203	Children with Developmental Challenges	2017	Students gain knowledge about the causes for various impairments and principles of assessment of children with disabilities and gifted children. The practical skills of management of special children were to be treated when they are placed as special educators in local schools ,colleges and at national Government organizations like NIMH,NIHH at national level and non government organizations at local level like Nava Jeevan center for Visually Challenged, RASS, PASS etc.
12.	HDCW-204	Practical-I Participation in ECE Center Practical	2017	Students will be able to apply skills in planning a day's activities for pre -school children , prepare Teaching Learning Material (TLM) and participate as student teacher in SVU Laboratory nursery school. The practical experience

				helps in establishing preschools, as entrepreneurs also to serve in Non Government institutions like Azim Premji Foundation, PRATHAM at national level and in Government sectors as extension officer at National level programs that are providing pre- school education
13.	HDCW-205	Practical-II Child Study Techniques Practical	2017	Students are apply skillsfor assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital
14.	HDCW-206	Practical-III Children with Developmental Challenges Practical	2017	Students are capable to use standardized techniques for assessment of IQ and personality of children. The knowledge and skills will be helpful when they work as school counselors in local schools and colleges and as counsellors in mental health institutions like VIMHANS ,Vijayawada and Child Guidance Clinics at local Government hospitals like SVRR hospital.
15.	HDCW-207	Research Methodology	2017	Student gain knowledge about types of research ,different methods of sampling and preparation of schedules/questionnaires. The students get skills in preparation of a research proposal. The knowledge helps the students to write articles for journals at national and international levels.
16.	HDCW -208	Human Values of Professional Ethics - II	2017	Understand the importance of value education and ethics in medical ,business ,environmental and social fields. The students apply the knowledge while joining in any profession and will contribute to society as socially responsible citizens.

17.	HDCW -301	Parent Education	2017	Students gain knowledge about different child rearing practices and parenting styles adopted by parents. Gain skills in planning education materials for parents ,conduct parent education programs in schools and community, when they work as a teachers at local schools. It helps to disseminate the knowledge related to impact of parenting styles on child behavior to parents , teachers and significant others in the community.
18.	HDCW-302	Theories and Approaches to Child Guidance	2017	Students describe different theories related to child development and understand the reasons for maladaptive behavior. Apply the knowledge of theories to understand the behavior of individuals and also in counselling , when they join as counselors at local schools and mental health institutions at regional level like VIMHANS ,Vijayawada , at national level like NIMH ,Hyderabad and at local level Child Guidance clinics run by Government hospitals like SVRR hospital.
19.	HDCW-303	Practical -I Rural Work Experience	2017	Students develop an understanding of rural life situations and problems related to nutrition and child development relevant to real field situations through practical training. They gain knowledge and skills to impart education related to health and nutrition to the rural audience. This experience will helpful when they join rural development programs run by government like Health and Nutrition Natural Farming Fellow in Natural Farming Project.
20.	HDCW-304	Practical-II Internship	2017	Students get hands-on experience in real life work settings relevant to the human development like SODHANA, Vijayanagaram, Christian Counselling Centre,Vellore, Sudheesha Counselling Centre, Hyderabad, VIMHANS,

				Vijayawada.
21.	HDCW-305	Generic Elective* a) Infant Development and Stimulation b) Family Life Education c) Planning For Project Management	2017	(a)Students gain knowledge of stimulation activities for physical ,language ,cognitive and social development of infants. The knowledge and skills will help to plan stimulation activities for infants ,when they establish crèche as entrepreneurs or serve in Day care centers. (b)Students understands the concepts of family life populationexplosion and education of family and population. The knowledge helps to understand the impact of over population and skills for obtain managing quality family life. (c) Students gain knowledge in identification of problem for a research project, apply skills in selection of tools ,data collection and report writing .The knowledge helps the students to write articles for national and international levels and also to take up small projects.
23.	HDCW -401	Guidance and Counselling in Human Development	2017	Students gain the knowledge of different approaches to counselling. This will apply counselling skills to practice counselling process. The knowledge helps the students towards employment as counsellors in mental health institutions like VIMHANS ,Vijayawada and local non government organizations like RASS ,PASS ,VIMHANS ,Vijayawada etc.
24.	HDCW -402	Advanced Human Development	2017	Students understand the characteristics and problems of early, middle and late adulthood persons. This knowledge helps when they get employment in Day care (or) foster care centers for elderly citizens (or) employment in Govt and , local old age homes run by non govt organizations like RASS and PASS etc.
25.	HDCW -403	Rehabilitation and	2017	Students understand the importance of Rehabilitation of children with

		Management of Children with Special Needs		developmental challenges through multi disciplinary approach. Gets practical knowledge about functioning of Govt and voluntary organizations that are managing children with developmental challenges .This helps students when they join as special educators at govt organizations like NIMH, Hyderabad and non govt organizations like RASS,PASS.
26.	HDCW-404	Practical Guidance and Counseling Practical	2017	Students gain the knowledge of different approaches to counselling. This will apply counselling skills to practice counselling process. The knowledge helps the students towards employment as counsellors in mental health institutions like VIMHANS ,Vijayawada and local non government organizations like RASS ,PASS ,VIMHANS ,Vijayawada etc.
27.	HDCW-404	Generic Elective* (a) Child and Human Rights or (b) Organization and management of Child welfare Institutions (c) Care For Elderly	2017	a).Students gain knowledge about human rights ,child rights and women rights. They can explains issues faced by women and children in difficult circumstances . The knowledge helps to understand the rights and problems of women and children when they work in Government organizations like Child Protection Officers. b).Students gain knowledge about the organizations striving for child welfare at national and international level. The knowledge helps when students join as supervisors in national schemes like ICDS and at regional level organization like RASS and PASS etc. c).Students understand the characteristics of old age theories relating to aging and causative factors for problems during old age. This knowledge helps when they establish care centers for elderly as entrepreneurs or work in organization

				catering to the welfare of elderly like “Karunadamam” run by TTD and Nava Jeevan old age home at local level.
28.	HDCW-406	Open Elective* (For other departments) a) Child Welfare Programs or (b) Disaster management	2017	a). Students gain knowledge about the organizations striving for child welfare at national and international level. The knowledge helps when students join as supervisors in national schemes like ICDS and at regional level organization like RASS and PASS etc. b).Students gain in-depth knowledge about natural disasters; manmade disasters; chemical hazards : disaster management. This helps to understand efforts made by the NGOs, Community based organizations and local administration in disaster management and also to help Government in times of disasters.

Extension Management and Communication Technology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	EMCT-101	Extension Education in Community Development	2017	The students can gain understanding on the Extension Management community development and panchayat raj system to study the community by using PRA and various approaches of extension education. The students will get jobs as extension officers, and various placements in community development projects, as well as rural co-operative sector.

2	EMCT-102	Community Nutrition	2017	The students know about nutrients in food and know about the nutritional deficiencies and the community level problems and policies and programmes of Nutrition.
3	EMCT-103	Communication and Media Preparation	2017	The concept of Communication –Recent trends in Instructional technology: Extension literature and the role of different factors influencing and effecting communication process- Dyad setting small group and mass communication. This course will help the students to improve their communication skills.
4	EMCT-104	Extension Education in Community Development Practical	2017	The students will acquire skill to study the community by using PRA techniques and develop the skill of critical analysis on various approaches of extension education.
5	EMCT-105	Community Nutrition Practical	2017	Students gain practical knowledge on the role of nutrients in different stages of human life and methods of nutritional assessment and community level problems and policies.

6.	EMCT-106	Communication and Media Preparation Practical	2017	Students analyze the role of different factors influencing and effecting communication process, preparation and use of different teaching aids in teaching different groups of people and in different learning situations.
7.	EMCT-107	Dynamics of Rural Society	2017	The students will gain knowledge on social structure; characteristics of rural people; rural social problems - social institutions, learn the factors affecting social change and gain insight about the welfare policies and programmes for rural society.
8.	EMCT-108	Human Values and Professional Ethics-1	2017	Students will apply knowledge of professional ethics and correlate the concepts in addressing the ethical issues outside the class room.
9.	EMCT-201	Entrepreneurial Development and Empowerment of Women	2017	Students acquire knowledge on Entrepreneurship, about the strategies for empowering women; rights of women and develop the entrepreneurship skills and learn about the institutional support of entrepreneurship. This course will help the students to become good entrepreneurs and also to start their own business enterprise.
10.	EMCT-202	Educational Technology	2017	The students gain knowledge on concept of teaching learning process; forms and levels of teaching and learning; curriculum design, development knowledge on genesis and trends in modern education. This will help the students to develop the curriculum and to choose their career in the teaching

				field.
11	EMCT-203	Community organization and Leadership	2017	Students will know about community organization, process of Community organization, rural institutions, leadership, analyze different patterns of leadership; techniques of identification of leaders; steps to organize youth clubs; Role of Panchayat in developing rural women.
12	EMCT-204	Entrepreneurial Development and Empowerment of Women Practical	2017	Students will realize the role of entrepreneurship in economic development. Develop the skill of writing the business proposal and starting of business enterprise.
13	EMCT-205	Educational Technology Practical	2017	Students will develop the skill on developing a course curriculum; Preparation of lesson plans of selected topics and use of different instructional materials.
14	EMCT-206	Community Organization and Leadership Practical	2017	Students will develop the skill on different patterns of leadership, techniques of identification of leaders, and appraise the ongoing programmes in the locality.
15	EMCT-207	Research Methodology	2017	Students get knowledge on ‘variables’, ‘hypothesis’ ,research ‘and recognize the purpose of doing a research, sampling methods and develop a research proposal in the appropriate scientific style.
16	EMCT-208	Human values and	2017	Students gain knowledge on ‘value education’ ‘self-introspection’ and ‘self-

		Professional Ethics-II		esteem develop well balanced personality, socially responsible persons of the society.
17	EMCT-301	Rural Development Administration	2017	Students gain insight about administration in Extension and rural development: coordination and supervision in rural development administration, the purpose and principles of administration; human relation in extension administration the recent ongoing rural development programmes etc. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
18	EMCT-302	Training and Development	2017	Students will learn the concept of training, goals of training; learning and types of learning, factors affecting learning among adult, current trends in training methodologies; training strategies and designs and acquire skills in developing; selection and use of different training methods- case study; role play; and brain storming; etc. This course will help the students to get jobs as Trainee- motivators, Trainers, consultants etc.
19	EMCT-303	Rural Work Experience	2017	Students will develop an understanding of rural life situations prevailing in villages with special reference to Home science among the student will know about socioeconomic conditions of people and their problems and several agencies and institutions involved in rural development.
20	EMCT-304	Internship	2017	Students will gain first-hand exposure of working with NGOs. This will provide a practice-oriented and 'Hands-on' working experience in the NGOs /

				Government organizations and to enhance the students learning experience.
21	EMCT-305	(a) Managerial Skills for Extension Professionals (b) Communication Technologies in Extension (c) Sustainable Livelihood Systems	2017	<p>Students will know about the conceptualization of management process and its major functions, managerial skill1; nature and importance for extension professionals. To understand the concept; scope and relevance of media in society; functions and future prospects of media systems</p> <p>To understand the concept; scope and Communication technologies, relevance of media in society; functions and future prospects of media systems etc</p> <p>Students will know about the livelihoods of rural/urban people; resources – land, soil; climate; water and forests; processes and relationships among agro-climatic and natural resources, understand the production systems- farming and non-farming activities; their linkage with the livelihoods of rural people, food security; livelihood security, indicators of environmental sustainability.</p>
22	EMCT-306	(a) Fundamentals of Food. Nutrition and Health (or) (b) Nutritional Assessment	2017	<p>Students gain knowledge on foods, food groups, balanced diet for different age groups, understand the importance of macro and micronutrients in daily diet.</p> <p>Students will learn the determinants of nutritional surveillance; understand the direct and indirect methods of nutritional assessment. Gain knowledge on</p>

				dietary assessment at individual and house hold level. Identify the clinical symptoms and biochemical tests for different nutritional problems.
23	EMCT-401	Principles of Guidance and Counseling	2017	Develop knowledge about the concept; purpose; functions and role of guidance; types of services in a guidance programme , counseling and counseling theories, group guidance and counseling; concept; characteristics; Individual v/s group techniques. This course will help the students to get jobs as counselors and in Government and Non-government organizations, as counselors, consultant research co-coordinators etc
24	EMCT-402	Extension Programme Planning and Evaluation	2017	Students will get knowledge about Programme planning in Extension; Programme Implementation; Programme Evaluation, Documentation, Programme Planning; the Preparation of plan of work ; Purpose, types and tools of Evaluation; Programme planning and implementation, documentation in Programme implementation. This course will help the students to get jobs as rural development officers, and get jobs in National NGOs like PRADHAN, CARE, SEWA etc
25	EMCT-403	Thesis/ Community Health Management	2017	Students gain knowledge about the concept of community health and global health; Primary Health Care – definitions; principles; components; comprehensive health care; levels of prevention, major health problems in India, management information systems in health, health needs of special groups – women, infants; and children; health of adolescents; geriatric health needs and problems.

26	EMCT-404	Principles of Guidance and Programme Planning Practical	2017	Assess the guidance programmes and counseling process in school and out of school settings and analyze use of standard test of study habits and attitudes (SSHA) for analyzing the study habits and attitudes.
27	EMCT-405	(a) Extension Management (b) Science & Technology for Rural Women (c) Environmental Management	2017	<p>Students will know about administration and management; process of management and organizational climate, understand the qualities and functions of extension personnel; Problems and issues of extension management in India.</p> <p>Analyze the management skills of extension personnel.</p> <p>Students will learn about the Science and Technology for rural development; Energy saving devices-application of solar energy; bio-gas etc., application of Science and Technology in Home science, safe water supply methods suitable for rural areas; health- hygiene and environmental sanitation.</p> <p>,agencies involved in research and application of Science and Technology.</p> <p>Students will get the knowledge about the life and the environment; physical-chemical factors in the environment; changes in the environment; eco-system-earth, methods of waste management; women and environment government and non-governmental agencies in promoting better health, factors affecting</p>

				changes in ecosystem and environment
28	EMCT-406	(a) Child Welfare Programmes or (b) Disaster Management	2017	Students will learn concepts of ‘child’ and ‘child welfare’, enlist children in need of care and difficult circumstances, understand the role of government, child welfare programmes developmental and rehabilitative manner to the disadvantaged people in the society, monitoring and evaluation Students will get an insight about natural disasters: manmade disasters; chemical hazards; National and International strategies to mitigate disaster management., global warming etc)efforts made by the NGOs, & Community based organizations and local administration in disaster management.

Food Technology

S. No.	Course Code	Title of the Course	Years Introduction	Course Outcomes
1	FT-101	Food Chemistry and Analysis	2017	<ul style="list-style-type: none"> - Students will acquire knowledge about physical, chemical, and functional properties of foods. - Learn the fundamental principles and working applications of different analytical techniques associated with food. - Students will be able to explore and perform skills in qualitative

				and quantitative estimation of nutrients in different foods.
2	FT-102	Food Science and Experimental Foods	2017	<ul style="list-style-type: none"> - Students will acquire knowledge on structure, composition and functional properties of plant and Animal foods. - Understand the principles of cookery of different foods and methods of evaluation. - Students will be able to apply the scientific method and quantitative techniques in standardisation of foods using different processing techniques.
3	FT-103	Cereal Grains, Legumes and Oilseed Technology	2017	<ul style="list-style-type: none"> - Students will gain knowledge on the structure and composition of cereal grains, pulses and oil seeds. - Understanding of the basic concepts of Post harvest technology, mechanism of equipments and processing of cereals, pulses and oilseeds - Know about various processing, milling process and evaluate Traditional and commercially processed foods with cereals, pulses and oilseeds
4	Practical-I	Food Chemistry and Analysis	2017	<ul style="list-style-type: none"> - The students will know about principles and working applications of different analytical techniques associated with food.

				<ul style="list-style-type: none"> - Perform skills in qualitative and quantitative estimation of nutrients in different foods.
5	Practical-II	Food Science and Experimental Foods	2017	<ul style="list-style-type: none"> - Comprehensive knowledge on techniques of analysing, evaluating and application of foods in different processing techniques in foods.
6.	Practical-III	Cereal Grains, Legumes and Oilseed Technology	2017	<ul style="list-style-type: none"> - The students will be able to explore knowledge on various processing techniques of cereals, legumes and oilseeds. - Students acquire knowledge in various food applications and product preparations.
7.	FT-104	Essentials of Food and Community Nutrition	2017	<ul style="list-style-type: none"> - Students gain knowledge about nutrients in food and their functions. - Understand the nutritional problems of the community and consequences of deficiency of taking nutrients. - Apply skills for planning diets and techniques to assess the nutritional status of different age groups
8.	FT-105	Human Values and Professional Ethics - I	2017	<ul style="list-style-type: none"> - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.

				<ul style="list-style-type: none"> - Values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society. - Introducing different concepts of Bhagavad Gita and its applications in uplifting of values in the present society.
9.	FT-201	Technology of Horticulture produce	2017	<ul style="list-style-type: none"> - Attain an overview on the classification composition and post-harvest handling technologies of fruits and vegetables to reduce postharvest losses and their value addition. - Impart the knowledge of processing, preservation and manufacture of fruits and vegetable based food products of fruits and vegetables. - Expertise in development of various Fruits & vegetables based products and assess the quality of fruit and vegetables and their products.
10.	FT-202	Food Microbiology and Safety	2017	<ul style="list-style-type: none"> - Obtain knowledge about important genera of microorganisms associated with food and food spoilages. - Understand the various factors associated with growth, food spoilage and food-borne diseases of different microorganisms. - Demonstrate the use of standard methods and procedures for the microbiological analysis of food
11	FT-203	Dairy Technology	2017	<ul style="list-style-type: none"> - Impart the knowledge of milk grading , composition and technologies of processing of milk and milk products.

				<ul style="list-style-type: none"> - Provide in-depth knowledge in various unit operations and developments in dairy processing. - Demonstrate the manufacturing of various dairy products and exemplify the quality of dairy products.
12	Practical-I	Technology of Horticulture produce	2017	<ul style="list-style-type: none"> - Student will know about various fruit and vegetable processing techniques and attain practical knowledge in production and preparation of products
13	Practical-II	Food Microbiology and Safety	2017	<ul style="list-style-type: none"> - Acquire knowledge on laboratory techniques to identify microorganisms in food. - Demonstrate the various microbial estimations in foods by applying standard techniques.
14	Practical-III	Dairy Technology	2017	<ul style="list-style-type: none"> - Students acquire knowledge of grading, composition, quality evaluation and processing techniques of milk and milk products.
15	FT-204	Research Methodology	2017	<ul style="list-style-type: none"> - Awareness about terms like ‘variables’, ‘hypothesis’, research ‘and recognize the purpose of doing research. - Understand different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research.

				<ul style="list-style-type: none"> - Critically apply knowledge to select a sample by using different sampling methods like probability and non-probability sampling and development of research proposal.
16	FT-205	Human Values and Professional Ethics – II	2017	<ul style="list-style-type: none"> - Student will know the values of ethics in various fields including medical, social and business ethics. - The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. - Introduction of several Natural values to be performed by Humans to lead a good and Peaceful life.
17	FT-301	Food processing and Preservation Technology	2017	<ul style="list-style-type: none"> - Students able to understand the scope, principles and different methods of processing and preservation techniques. - Acquire knowledge of emerging technologies and their applications in food processing and preservation. - Understand the applications and limitations of food processing and preservation technology.
18	FT-302	Live Stock and Sea Food technology	2017	<ul style="list-style-type: none"> - Acquire knowledge of the structure, composition, nutritional quality of various, livestock and seafood. - Gain insight knowledge of slaughtering, carcass processing, processing methods used for processing meat poultry and fish. - Prepare various value-added products of egg, meat, poultry and sea foods.

19	Practical-I	Food Processing and Preservation Technology	2017	<ul style="list-style-type: none"> - Student acquires knowledge of emerging technologies and their applications in various processing techniques and products of various foods by processing and preservation methods.
20	Practical-II	In plant training	2017	<ul style="list-style-type: none"> - Provide hands on experience with regard to different areas in food industries. - Acquaint and gain knowledge related to production, unit operations, quality control and marketing aspects of food industry. - Emphasize the prominence of food plant sanitation, food safety, standards, laws and regulation in food industry.
21	FT -303(a)	a)Unit operations in Food Industry.	2017	<ul style="list-style-type: none"> - Important preliminary operations in food processing industries and understand the principle of Unit operation in food industry. - Impart knowledge on Safety, sanitation and Effluent Treatment in food industry. - Know the different pre and post processing operations as storage and packaging foods etc.
22	FT -303(b)	b) Spices, Condiments and Plantation Crops	2017	<ul style="list-style-type: none"> - Students acquire knowledge, identification and post-harvest technologies of various spices, condiments and plantation crops. - Illustrate various value added products of spices, condiments and

				<p>plantation crops.</p> <ul style="list-style-type: none"> - Perceive Standards, specifications, packaging and Quality control measures of spices, condiments and plantation crops.
23	FT -303(c)	c) Nutrition in Emergencies and Disaster	2017	<ul style="list-style-type: none"> - Explain concepts on Epidemiology and its application in planning programs during emergencies and emergency situations in natural and manmade disasters. - Gain knowledge on nutrition surveillance and treatment in emergencies. - Knowledge on planning nutrition relief and rehabilitation in emergencies.
24	FT -304(a)	(a)Fundamentals of Food, Nutrition and Health	2017	<ul style="list-style-type: none"> - Gain knowledge on foods, food groups, balanced diet and importance of macro and micronutrients for different age groups in daily diet. - Comprehend knowledge on deficiency symptoms of different nutrients. - Apply skills to assess on nutritional problems in community.
25	FT -304(b)	b)Nutritional Assessment	2017	<ul style="list-style-type: none"> - Understand the nutritional problems of the community and consequences of deficiency of taking nutrients.

				<ul style="list-style-type: none"> - Apply skills for planning diets and techniques to assess the nutritional status of different age groups.
26	FT-401	Food Safety Standards and Quality Control	2017	<ul style="list-style-type: none"> - Gain knowledge in current rules and regulations of food safety standards and quality assurance. - Understand the insight quality evaluation of different foods by standard methods. - Develop skills for quality analysis and assurance of food quality.
27	FT-402	Food Product Development and Marketing	2017	<ul style="list-style-type: none"> - Elucidate the process of new food product development process to generate ideas, develop concept to test market and in food industry. - Acquire the skill to design and development of new food product and analyse the quality of the product. - Student able to design, demonstrate the skills in food process, organoleptic evaluation and nutritional label of food products as a team work.
28	FT-403	Nutrition for Health and Fitness/Project Work	2017	<ul style="list-style-type: none"> - Understand the concepts of Health, Nutrition, physical activity, physical fitness and methods of evaluation. - Describe the role of nutrients in physical performance, weight management, obesity and Energy metabolism pathways during physical activity. - Gain knowledge on concepts of physical activity, physical fitness and the importance of nutrients in Sports.

29	Practical-I	Food Safety standards and Product Development	2017	<ul style="list-style-type: none"> - Gain knowledge on subjective and objective evaluation methods of foods with safety and standards. - Exemplify various speciality food products and their applications, acquire the skill to design and development of new food product and analyse the quality of the product.
30	FT-404(a)	(a) Institutional food service management	2017	<ul style="list-style-type: none"> - Gain knowledge on principles of safe food preparation and cooking methods and service management
31	FT-404(b)	(b)Basic Food Engineering	2017	<ul style="list-style-type: none"> - Student understands the basic Principles, overview of processing techniques and methods of food. - Able to describe the types and properties of agro processing equipments like pasteurizer, spray drier and sealing equipments. - Enumerate processing equipments and maintenance of processing equipments
32	FT-404(c)	(c)Food Packaging	2017	<ul style="list-style-type: none"> - Enable the students to understand the regulations of packaging and packaging material testing. - Knowledge of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life. - Able to utilize some of the new innovations in food packaging to improve product stability and/or to extend the product shelf-life.
33	FT- 405(a)	(a) Child Welfare Programmes	2017	<ul style="list-style-type: none"> - Understand the different developments like physical, cognitive, language and social development during childhood.

				<ul style="list-style-type: none"> - Apply knowledge to understand normal development and developmental delays during childhood.
34	FT- 405(b)	(b)Disaster Management	2017	<ul style="list-style-type: none"> - Understand natural disasters (like floods, drought, cyclone, earthquakes, global warming etc); Nuclear disasters; Biological disasters; - Illustrate the efforts made by the NGOs, Community based organizations and local administration in disaster management.

31. Mathematics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	MA 101	Algebra	2017	<ol style="list-style-type: none"> 1. Identify the concept of action and conjugation. 2. Analyze the maximal, prime, nilpotent and Nil ideals.
2.	MA 102	Real Analysis	2017	<ol style="list-style-type: none"> 1. Understand the concepts of Riemann Stieltjes integration and Differentiation. 2. Understand Uniform Convergence and continuity.
3.	MA 103	Ordinary Differential Equations	2017	<p>Course outcomes: From this course students will be able to</p> <ol style="list-style-type: none"> 1. Learn boundary value problems, Eigen values and Eigen functions

4.	MA 104	Complex Analysis	2017	<ol style="list-style-type: none"> 1. Decide when and where a given function is analytic . 2. Understand the Mobius Transformation. 3. Describe basic properties of complex integration and having the ability to compute such integrals.
5.	MA 105	Computer Oriented Numerical Methods	2017	<ol style="list-style-type: none"> 1. Apply numerical methods to obtain approximate solutions to mathematical problems. 2. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and non linear equations, and the solution of differential equations. 3. Solve any numerical problem by using programming.
6.	MA 106	Human Values and Professional Ethics-I	2017	<ol style="list-style-type: none"> 1. Develop Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic virtue, Respect for others, Living Peacefully, Caring, Sharing, Honesty, Courage, Cooperation, Commitment, Empathy, Self Confidence character, Spirituality, Case study. 2. Understand human values . 3. Develop character, affection and love towards other human beings.

7.	MA 201	Galois Theory	2017	<ol style="list-style-type: none"> 1. Apply the knowledge on polynomials solvable by radicals, Extension field. 2. Understand the normal and separable extensions. 3. Study the roots of polynomials specially quintic polynomials which is the cause to develop Galois theory.
8.	MA 202	Partial Differential Equations	2017	<ol style="list-style-type: none"> 1. solve Pfaffian differential equations and find orthogonal trajectories of a curve. 1. Analyze the origin of first order PDEs and Integral surfaces passing through a given curve 2. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method.
9.	MA 203	Topology	2017	<ol style="list-style-type: none"> 1. Understand to construct topological spaces from metric spaces and using general properties of neighborhoods, open sets, closed sets, basic and sub-basis. 2. Understand Topological Spaces, definition & examples. 3. Know the concepts connectedness, compactness, and Hausdorff property and their general characteristics. 4. Understand the Countability axioms, the separation axioms and normal spaces. And also the classical

10.	MA 204	Advanced Complex Analysis	2017	<ol style="list-style-type: none"> 1. To learn Laurent Series-Singular Points. 2. Explain the basic properties of complex integration and compute such integrals. 3. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions. 4. Understand the Infinite product and Partial Fraction Expansions.
11.	MA 205	Measure and Integration	2017	<ol style="list-style-type: none"> 1. Compute Lebesgue measures. 2. Compute Lebesgue integrals of bounded functions over a set of finite measure 3. Solving the Differentiation and Integration of Monotone functions.
12.	MA 206	Human Values and Professional Ethics-II	2017	<ol style="list-style-type: none"> 1. Understand the fundamental responsibilities and respect towards women 2. Know the value of education. 3. Question the illegal practices in the medical and business fields. 4. Understand the value of ecological balance and act in

13.	MA 301	Commutative Algebra	2017	<p>To understand the ideals, Modules and operations on them.</p> <p>2.To learn the structures of composition series with ACC and DCC</p>
14.	MA 302	Functional Analysis	2017	<ol style="list-style-type: none"> 1) Work with different distance metrics and normed spaces, understand continuous linear transformations and the Hahn-Banach Theorem. 2) Comprehend the Open mapping theorem and Closed graph theorem. 3) Construct orthonormal sets and conjugate spaces. 4) Understand the relevance of self-adjoint operators, normal, unitary operators and
15.	MA 303	Classical Mechanics	2017	<ol style="list-style-type: none"> 1) Understand D' Alembert's Principle and simple applications of the Lagrangian Formulation. 2) Derive the Lagrange's Equation from Hamilton's Principle. 3) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems. 4) Distinguish the concept of the Hamilton Equations of Motion and the Principle of Least Action.

16.	MA 304	A) Differential Geometry B)Cryptography C) Linear Algebra D) Discrete Mathematics	2017	1. Define space curves , curvature and torsion of a curve. 2. Parameterize surfaces and isometric correspondence. 3. Understand geodesic curves and conformal mapping. 4. calculate and analyse curvature of surfaces in different settings. 1) Understand various Cryptographic Techniques. 2) Apply various public key cryptography techniques. 3) Understand the various Security Applications. 4) Implement system level security applications. 5) Be familiar with secure random bit generator and linear feedback shift register sequences. 6) Know classical ciphers such as Vigenere Cipher and Hill Cipher. 7) Know of RSA, attacks on RSA, Diffie-Hellman key exchange and ElGamal, public key crptosystem. Solve the system of linear equations 2 .Understand the concept of vector space, basis, dimension and linear Transformation 3. Explain the direct sum decompositions
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17.	MA 305	A) Business Mathematics B) Basic Mathematics for social sciences	2017	<ol style="list-style-type: none"> 1. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems. 2. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and business. 3. Explain the concepts and use equations, formulae and mathematical expressions and relationships in a variety of contexts 4. Understand The Binary Octal , Octal, Decimal and Hexadecimal Systems. 5. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 6. Understand the concepts of Limit, continuity & differentiation of functions.
18.	MA 401	Number Theory	2017	<p>.</p> <ol style="list-style-type: none"> 1. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components. 2. Understand the concepts of Limit, continuity & differentiation of functions. 3. Apply Integrals to find areas, length & volume of regions.

19.	MA 402	Banach Algebra	2017	<ol style="list-style-type: none"> 1. Understand different types of Banach Algebras with examples. 2. Know the essence of Gelfand mapping 3. Understand the Application of Commutative C*- algebras. 4. Derive the applications of Banach Algebra in analysis, Fourier series Boolean Algebras and other significant areas
20.	MA 403	Graph Theory	2017	<p>Able to define basic concepts of graphs</p> <ol style="list-style-type: none"> 2. Utilize the Algorithms to find the shortest path, Optimal tree from a given graph. 3. construct reliable communication network.
21.	MA 404	A) Mathematical Statistics B) Approximation Theory C) Algebraic Coding Theory D) Operations Research	2017	<p>To learn the fundamental concepts of statistics and techniques required for data analysis.</p> <ol style="list-style-type: none"> 2. Apply the knowledge of Binomial, Poisson, Gamma, chi-square, normal distribution in solving various problems,.

22.	MA 405	A) Theoretical Computer science B) Biomechanics	2017	<ol style="list-style-type: none"> 1) Know the Basic concepts of Metric spaces And Normed Linear space. 2) Knows existence and uniqueness theorems for the best approximations in various Banach spaces. 3) Knows Bernstein's lethargy theorem and its practical and theoretical implications. 4) Be able to use and analyze the basic methods for polynomial approximations.
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APPLIED MATHEMATICS:

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
23.	AMA101	METHODS OF APPLIED MATHEMATICS	2017	<ol style="list-style-type: none"> 1. Expand a function in a Fourier series and able to know under what conditions such an expansion is valid. 2. Aware of the connection between integral transforms (Fourier and Laplace) and be able to use the latter to solve mathematical problems relevant to the physical sciences. 3. Understand the applications of Sylow theorems. 4. Describe Unique Factorization and Euclidean Domains.

24.	AMA 102	Real Analysis	2017	<p>5. Understand the concepts of Riemann Stieltjes integration and Differentiation.</p> <p>6. Understand Uniform Convergence and continuity.</p>
25.	AMA 103	Ordinary Differential Equations	2017	<p>5. Learn boundary value problems, Eigen values and Eigen functions</p> <p>6. Solve the second order linear questions.</p> <p>7. Apply knowledge on special functions of Mathematical Physics.</p> <p>8. Understand the method of successive approximation and solve the problems related to Picard's theorem</p>
26.	AMA 104	Complex Analysis	2017	<p>5. Decide when and where a given function is analytic .</p> <p>6. Understand the Mobius Transformation.</p> <p>7. Describe basic properties of complex integration and having the ability to compute such integrals.</p>
27.	AMA 105	Computer Oriented Numerical Methods	2017	<p>4. Apply numerical methods to obtain approximate solutions to mathematical problems.</p> <p>5. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and non linear equations, and the solution of differential equations.</p> <p>6. Solve any numerical problem by using programming.</p> <p>Develop interest in Numerical analysis to use finite precision</p>

28.	AMA 106	Human Values and Professional Ethics-I	2017	<p>5. Develop Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic virtue, Respect for others, Living Peacefully, Caring, Sharing, Honesty, Courage, Cooperation, Commitment, Empathy, Self Confidence character, Spirituality, Case study.</p> <p>6. Understand human values .</p> <p>7. Develop character, affection and love towards other human beings.</p> <p>8. Know the value of Four Noble Truths of Buddhism</p>
29.	AMA 202	Partial Differential Equations	2017	<p>1. solve Pfaffian differential equations and find orthogonal trajectories of a curve.</p> <p>1. Analyze the origin of first order PDEs and Integral surfaces passing through a given curve</p> <p>2. Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method.</p> <p>3. Apply various methods to solve Partial Differential Equations of the Second order.</p> <p>4. Obtain equipotential surfaces using Laplace's equation.</p>

30.	AMA 203	Topology	2017	<p>5. Understand to construct topological spaces from metric spaces and using general properties of neighborhoods, open sets, closed sets, basic and sub-basis.</p> <p>6. Understand Topological Spaces, definition & examples.</p> <p>7. Know the concepts connectedness, compactness, and Hausdorff property and their general characteristics.</p> <p>8. Understand the Countability axioms, the separation axioms and normal spaces. And also the classical theorems such as</p>
31.	AMA 204	Advanced Complex Analysis	2017	<p>5. To learn Laurent Series-Singular Points.</p> <p>6. Explain the basic properties of complex integration and compute such integrals.</p> <p>7. Learn topics of contemporary Advanced complex analysis in particular spaces of holomorphic functions, entire functions, harmonic functions and conformal mapping functions.</p> <p>8. Understand the Infinite product and Partial Fraction Expansions.</p>

32.	AMA 205	Measure and Integration	2017	<p>Compute Lebesgue measures.</p> <p>2. Compute Lebesgue integrals of bounded functions over a set of finite measure</p> <p>3. Solving the Differentiation and Integration of Monotone functions.</p>
33.	AMA 206	Human Values and Professional Ethics-II	2017	<p>6. Understand the fundamental responsibilities and respect towards women</p> <p>7. Know the value of education.</p> <p>8. Question the illegal practices in the medical and business fields.</p> <p>9. Understand the value of ecological balance and act in such a way which saves it.</p> <p>10. Analyze the impact of media.</p>

34.	AMA301	CONTINUUM MECHANICS		<ol style="list-style-type: none"> 1) Be able to describe motion, deformation and forces in a continuum. 2) Be able to derive equations of motion and conservation laws for a continuum. 3) Understand constitutive models for fluids and viscoelastic solids. 4) Formulate and solve specific technical problems of displacement, strain and stress. 5) Perform experiments with stresses and deformations. 6) Numerically model and analyse the stresses and deformations of simple geometries under an arbitrary load in both solids and liquids.
35.	AMA 302	Functional Analysis	2017	<ol style="list-style-type: none"> 5) Work with different distance metrics and normed spaces, understand continuous linear transformations and the Hahn-Banach Theorem. 6) Comprehend the Open mapping theorem and Closed graph theorem. 7) Construct orthonormal sets and conjugate spaces. 8) Understand the relevance of self-adjoint operators, normal, unitary operators and projections.

36.	AMA 303	Classical Mechanics	2017	<p>5) Understand D' Alembert's Principle and simple applications of the Lagrangian Formulation.</p> <p>6) Derive the Lagrange's Equation from Hamilton's Principle.</p> <p>7) Study the concept of the Equations of Motion and the Equivalent One-Dimensional Problems.</p> <p>8) Distinguish the concept of the Hamilton Equations of Motion and the Principle of Least Action.</p>
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37.	AMA 304	A) Differential Geometry B)Cryptography C) Linear Algebra D) Discrete Mathematics	2017	1. Define space curves , curvature and torsion of a curve. 2. Parameterize surfaces and isometric correspondence. 3. Understand geodesic curves and conformal mapping. 4. calculate and analyse curvature of surfaces in different settings. 8) Understand various Cryptographic Techniques. 9) Apply various public key cryptography techniques. 10) Understand the various Security Applications. 11) Implement system level security applications. 12) Be familiar with secure random bit generator and linear feedback shift register sequences. 13) Know classical ciphers such as Vigenere Cipher and Hill Cipher. 14) Know of RSA, attacks on RSA, Diffie-Hellman key exchange and ElGamal, public key crptosystem. Solve the system of linear equations 2 .Understand the concept of vector space, basis, dimension and linear Transformation 3. Explain the direct sum decompositions 4. Understand the Bilinear forms. 5. Use standard Normal Forms-Disiunctive-Coniunctive
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38.	AMA 305	A) Business Mathematics B) Basic Mathematics for social sciences	2017	<p>9. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems.</p> <p>10. Analyse and demonstrate mathematical skills required in mathematically intensive areas in Economics and business.</p> <p>11. Explain the concepts and use equations, formulae and mathematical expressions and relationships in a variety of contexts</p> <p>12. Understand The Binary Octal , Octal, Decimal and Hexadecimal Systems.</p> <p>13. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components.</p> <p>14. Understand the concepts of Limit, continuity & differentiation of functions.</p>
39.	AMA 401	Number Theory	2017	<p>.</p> <p>5. Understand the concepts of vector spaces with bases, algebra of Transformations and orthogonal components.</p> <p>6. Understand the concepts of Limit, continuity & differentiation of functions.</p> <p>7. Apply Integrals to find areas, length & volume of regions.</p>

40.	AMA402	FLUID DYNAMICS	2017	<ol style="list-style-type: none"> 1) Be familiar with continuum model of fluid flow and classify fluid/flows based on physical properties of a fluid/flow along with Eulerian and Lagrangian descriptions of fluid motion. 2) Derive and solve equation of continuity, equations of motion, vorticity equation, equation of moving boundary surface, pressure equation and equation of impulsive action for a moving inviscid fluid. 3) Understand Boundary layer Equations. 4) Solve Analytic Boundary layer equations .
41.	AMA 403	Graph Theory	2017	<p>Able to define basic concepts of graphs</p> <ol style="list-style-type: none"> 2. Utilize the Algorithms to find the shortest path, Optimal tree from a given graph. 3. construct reliable communication network. 4. Understand the concepts of practical problems like Chinese postman problem and travelling salesman problem

42.	AMA 404	A) Mathematical Statistics B) Approximation Theory C) Algebraic Coding Theory D) Operations Research	2017	To learn the fundamental concepts of statistics and techniques required for data analysis. 2. Apply the knowledge of Binomial, Poisson, Gamma, chi-square, normal distribution in solving various problems,.
43.	AMA 405	A) Theoretical Computer science B) Biomechanics	2017	5) Know the Basic concepts of Metric spaces And Normed Linear space. 6) Knows existence and uniqueness theorems for the best approximations in various Banach spaces. 7) Knows Bernstein's lethargy theorem and its practical and theoretical implications. 8) Be able to use and analyze the basic methods for polynomial approximations.

32. Microbiology

Course Code	Title of the Course	Years of Introduction	Course Outcomes
MB-102	Enzymology & Microbial Physiology & Metabolism	2017	Be able to know about the nutrition and microbial growth. Be able to know about photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration. Be able to know in depth about various pathways in protein and nucleotide metabolisms

MB-105	Introductory Microbiology	2017	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
MB-106	Human Values and Professional Ethics – I	2017	Nature of Values- Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice, responsibility and freedom. Good behavior and respect for elders, Character and Conduct.
MB-202	Medical Microbiology	2017	Be able to explain about various infections. Be able to understand the diagnostic methods. Be able to explain the symptoms of bacterial infections. Be able to explain the symptoms of viral, fungal and parasitic diseases.
MB-204P	Practical – II Medical Microbiology	2017	Able performs various immune precipitations tests. Be able to perform various types of ELISA methods. Be able to gain practical knowledge about immunoglobulin's and there separation.

			<p>Be able to perform widal, VDRL and types.</p> <p>Be able to perform various staining procedures.</p> <p>Be able to identify blood cell types.</p>
MB-205	Basics of Virology	2017	<p>Explaining the biological and physical properties of viruses. Describing the differences between viruses vs. virion. Summarizing the different methods of viral study. Explaining tissue and cell culture. Discussing cloning genes and genomes, DNA sequencing and PCR. Listing analysis of components SDS treatment & electrophoresis for nucleic acids.</p> <p>Classifying plants viruses as: single stranded RNA (SS RNA), double stranded RNA (DS RNA); single stranded DNA (SS DNA) and double stranded DNA (DS DNA). Demonstrating knowledge about the genetic composition of plant viruses. Demonstrating knowledge of different viruses shape (rods, polyhedral and bullets). Describing the structure, replication and diseases caused by viruses in the families, Picornaviridae, Togaviridae, Flaviviridae, Caliciviridae, Astoviridae, Coronaviridae, and Arteriviridae. Explaining the structure, replication and diseases caused by viruses in the families, Rhabdoviridae, Paramyxoviridae, Filoviridae, Orthomyxoviridae, and Bunyaviridae</p>
MB-206	Human Values and Professional	2017	<p>Medical ethics- Views of Charaka, Sushruta and Hippocrates on moral responsibility of medical practitioners. Code of ethics for medical and health</p>

	Ethics –II		<p>care professionals. Euthanasia, Ethical obligation to animals, Ethical issues in relation to health care professionals and patients.</p> <p>Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions.</p> <p>Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.</p>
MB 302	Recombinant DNA technology & Bioinformatics	2017	This course teaches RDNA technology techniques and their application in the field of genetic engineering. They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries. Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering
MB 305	b) food microbiology	2017	Through this course, they also learn about microbiology of milk, fermented dairy products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms.
MB-306	b) Industrial food Microbiology	2017	Students in this course will learn about microbes in food, spoilage of food and preservation techniques of food. Through this course, they also learn about microbiology of milk, fermented dairy products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms. At the end of the course, the student will be able to use the preservation techniques for food and use this experience to be employed as quality control experts
MB 405b	Bioprocess	2017	After completing this course, the student will be able to define a bacterium, a

	engineering		fungus, a virus and archaea, give examples of structurally different microbes, and list microbes by their energy metabolism and carbon sources. The student will be able to evaluate the cultivation, enrichment and growth prevention methods for microbes. The student will be able to explain the roles of microbes in elemental cycles on Earth and, the waste decontamination methods based on microbial activities. He/she will be able to judge how microbes and enzymes could be applied in industry.
MB-406a	Fermentation technology	2017	The course aims to provide fundamental insights to exploit microbes for manufacturing of products which have huge industrial significance. The course blends science and engineering with various biochemical processes to obtain products such as food, chemicals, vaccines, medicine . At the end of the course, the student will have a better appreciation for the role of microbes in industry using technology Able to design procedures, record research methodology and interpret the research
MB-406b	Pharmaceutical Microbiology	2017	This course prepares the students in appreciating the its benefits and applications in biotechnological, pharmaceutical, medical field.

INDUSTIAL MICROBIOLOGY:

Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship/Skill development
IMB-102	Enzymology &	2017	Be able to know about the nutrition and microbial growth. Be able to know about

	Microbial Physiology & Metabolism		<p>photosynthesis and carbon. Be able to know in depth details about aerobic and anaerobic respiration.</p> <p>Be able to know in depth about various pathways in protein and nucleotide metabolisms</p>
IMB-105	Introductory Microbiology	2017	<p>Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae</p>
IMB-106	Human Values and Professional Ethics – I	2017	<p>Nature of Values- Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice, responsibility and freedom.</p> <p>Good behavior and respect for elders, Character and Conduct.</p>
IMB-202	Medical Microbiology	2017	<p>Be able to explain about various infections.</p> <p>Be able to understand the diagnostic methods.</p> <p>Be able to explain the symptoms of bacterial infections.</p> <p>Be able to explain the symptoms of viral, fungal and parasitic diseases.</p>
IMB-204P	Practical – II	2017	Able performs various immune precipitations tests.

	Medical Microbiology		<p>Be able to perform various types of ELISA methods.</p> <p>Be able to gain practical knowledge about immunoglobulin's and there separation.</p> <p>Be able to perform widal, VDRL and types.</p> <p>Be able to perform various staining procedures.</p> <p>Be able to identify blood cell types.</p>
IMB-205	Basics of Virology	2017	<p>Explaining the biological and physical properties of viruses. Describing the differences between viruses vs. virion. Summarizing the different methods of viralstudy. Explaining tissue and cell culture. Discussing cloning genes and genomes, DNA sequencing and PCR. Listing analysis of components SDS treatment & electrophoresis for nucleic acids.</p> <p>Classifying plants viruses as:single strained RNA (SS RNA), double strained RNA(DS RNA); single strained DNA (SS DNA) and double strained DNA (DS DNA). Demonstrating knowledge about the genetic composition of plant viruses. Demonstrating knowledge of different viruses shape (rods, polyhedral and bullets). Describing the structure, replication and diseases caused by viruses in the families, Picornaviridae, Togaviridae, Flaviviridae, Caliciviridae, Astoviridae, Coronaviridae, and Arteriviridae. Explaining the structure, replication and diseases caused by viruses in the families, Rhabdoviridae, Paramyxoviridae, Filoviridae, Orthomyxoviridae, and Bunyaviridae</p>
IMB-206	Human Values	2017	Medical ethics- Views of Charaka, Sushruta and Hippocrates on moral responsibility

	and Professional Ethics –II		<p>of medical practitioners. Code of ethics for medical and health care professionals. Euthanasia, Ethical obligation to animals, Ethical issues in relation to health care professionals and patients.</p> <p>Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions.</p> <p>Characteristics of ethical problems in management, ethical theories, causes of unethical behavior, ethical abuses and work ethics.</p>
IMB 305	b) Bioprocess Engineering and Technology	2017	<p>Give elaborate knowledge on Health care products.</p> <p>Provide in depth knowledge about microbial antibodies and recombinant products.</p> <p>Provide detailed knowledge about organic acids and enzymes.</p> <p>Gives in depth knowledge on oxidative transformation.</p>
IMB-306	a) Industrial Biotechnology	2017	<p>Be able to gain knowledge on strain improvement.</p> <p>Be able understand the whole broth processing.</p> <p>Gain knowledge on production of industrial products</p>
	b)Immuno Technology and Human Health	2017	<p>Immunology and Human Health is designed to advance your understanding of the Immune system and to apply this knowledge to basic immunological research of human diseases. The immune system is composed of numerous cells and molecules that act in concert to maintain health, to overcome infection, prevent tumour growth and repair damaged tissues. The study of the immune system provides us with a fascinating insight into the relationship between animals, and the organisms that</p>

			infect them (bacteria, viruses, protozoans and fungi). This subject provides a greater understanding of the complexity of the immune system and its responses to stresses such as infection. It demonstrates how modulation, or activation, of the immune system can either help overcome infection or may lead to autoimmune disease. Understanding the immune system gives us the potential to develop therapies to control events such as infection or autoimmune conditions. This subject helps students expand their understanding of current concepts in immunology and the potential application of applied immunology in medicine, research and industry.
IMB-404	Field Trip/ Industrial Tour Report / Dissertation	2017	Able to design procedures, record research methodology and interpret the research Able to design procedures, record research methodology and interpret the research
IMB-405	a) Biostatistics & Bioinformatics	2017	Be able to gain knowledge on basic concepts in statistics. Be able to design the experimental and statistical basics of biological assays. Be able to give familiarize with microbial genomes Be able to acquaint themselves with metagenomics Be able to learn basics of protein identification method Be able to gain knowledge on drug discovery
IMB-406	a) Microbes in	2017	Microbes are the major components of biological system on this earth. They are

	Human Welfare		<p>present everywhere, even at sites where no other life could possibly exist. Many microbes are useful to human beings. We use microbes and microbial derived products almost every day like curd and other fermented foods like idli, dosa, bread, etc. Microbes are also used in most of the industries. Alcohol, antibiotics, vinegar, etc are important microbial products. Microbes are very helpful in sewage treatment, biogas production and preparation of biofertilizers as well. So it's clear from this chapter that microbes play a very important role in welfare of human society.</p>
	b) Medical and Diagnostic Microbiology	2017	<p>Describe the aetiologies, epidemiology and basic mechanisms of pathogenesis of infectious diseases.</p> <p>Describe the basic principles of diagnosis, antimicrobial treatment, prevention and control of infectious diseases in the hospital and community.</p> <p>Describe the host immune system and explain the host response to infection</p> <p>Understand and interpret basic laboratory tests for the diagnosis of infectious diseases.</p> <p>Apply the principles of molecular and immunological techniques for the diagnosis of infectious diseases.</p> <p>Analyze and solve case studies involving bacterial and fungal agents</p>

33. Physics

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1.	PHY 101	Classical Mechanics and Statistical Mechanics	2017	<ol style="list-style-type: none"> 1. Understanding the Lagrangian and Hamiltonian mechanics and solving the related problems. 2. Learn the concepts of Poisson brackets, Hamilton-Jacobi equations and action angle variables. 3. Learn different ensembles and partition functions in statistical mechanics and their applications.
2.	PHY 102	Analog and Digital Electronics	2017	<ol style="list-style-type: none"> 1. Utilize the basic knowledge in Electronics and Communication Engineering field. 2. Understand the design and working of BJT/FET/ MOSFETs based electronic circuits and perceive the effect of positive feedback on working of Op-Amps based Oscillators. 3. Develop the skills to design and analyze analog and digital

3.	PHY 103	General Physics lab 1	2017	<p>Understand the laws related to electrostatics and magnetostatics and also light propagation.</p> <p>2. Understand the basics of atomic physics.</p> <p>3. Understand the Zeeman effect , Paschen-Back effect and Stark effects in detail.</p> <p>4. Know the importance of Rotational and Vibrational spectra</p>
4.	PHY 104	Electronics lab 1	2017	<p>1. Understand the core values that shape the ethical behaviour in various professions.</p> <p>2. Expose awareness on professional ethics and human values.</p> <p>3. Get awareness on the importance of spirituality.</p>
5.	PHY 105	Electro magnetic theory, Atomic and Molecular Physics	2017	<p>Determining the value of Planck's constant and Seebeck coefficient of a thermocouple, and also determination of wavelength.</p> <p>2. Learn structural determination using X-ray diffraction method.</p> <p>3. Improve demonstration of skills related to the said experiments in Physics</p>
6.	PHY 106	Human values &Professional Ethics-I	2017	<p>1. Identify relevant information to supplement the Analog Electronic Circuits.</p> <p>2. Set up testing strategies and select proper instruments to evaluate the performance characteristics of the electronic circuit.</p> <p>3. Choose testing and experimental procedures on different types</p>

7.	PHY 201	Lasers and Modern optics	2017	<p>Understand the properties of lasers and various applications in different fields.</p> <p>2. Know the importance of non linearity in physics problems and solutions.</p> <p>3. Understand the principles and different types of holography; and its applications</p>
8.	PHY 202	Mathematical Physics	2017	<p>Understand and apply the mathematical skills to solve quantitative problems in physics.</p> <p>2. Apply Laplace and Fourier transforms in solving different problems of mechanics, electronics etc.</p> <p>3. Solve different physical problems related to partial differential</p>
9.	PHY 203	General Physics lab 2	2017	<p>Understand different bonds in solids, importance of lattice vibrations, their models and elastic properties.</p> <p>2. Explain electronic properties of solids in classical, quantum and the nearly free electron model.</p> <p>3. Able to classify materials as metals, insulators and semiconductors and sketch the band diagram for each</p>

10.	PHY 204	Electronics lab 2	2017	<ol style="list-style-type: none"> 1. Understand the issues which will help to sensitize students to be broader towards the social, cultural, economic and human issues, involved in social changes 2. Know the nature of the individual and the relationship between the self and the community 3. Understanding major ideas, values, beliefs, and experiences
11.	PHY 205	Solid State Physics	2017	<ol style="list-style-type: none"> 1. Lasers and its slit width calculation and refractive index measurement, Young's modulus finding through interference and Stefan's constant calculation 2. Intensity variation of light, photo transistor working, absorption and decay of nuclear radiation
12.	PHY 206	Human values & Professional Ethics-II	2017	<ol style="list-style-type: none"> 1. Identify relevant information to supplement the Analog Electronic Circuits. 2. Set up testing strategies and select proper instruments to evaluate the performance characteristics of the electronic circuit. 3. Choose testing and experimental procedures on different types
13.	PHY 301	Quantum Mechanics – I	2017	<ol style="list-style-type: none"> 1. Solve the problems in quantum mechanics using Schrodinger's equation and Dirac representation. 2. Grasp the importance of quantum dynamics in solving the problems.

14.	PHY 302	Physics of semiconductor devices	2017	<ol style="list-style-type: none"> 1. Classify different diodes and its importance in different applications. 2. Understand the basic principles of diodes .
15.	PHY 303	<ol style="list-style-type: none"> a. Applied spectroscopy b. condensed matter physics c. electronics embedded systems 	2017	<ol style="list-style-type: none"> 1. Understand the molecular structure. 2. Know the importance of various molecular transitions and also about rotational, vibrational and Raman spectra of molecules. 3. Understand the instrumentation techniques that are used in different regions of spectra. 4. Familiar with fluorescence and phosphorescence spectroscopy and their applications. <ol style="list-style-type: none"> 1. Learn the various crystal growth techniques and their importance, and also to analyze the defects 2. Know the different dielectric properties and methods to study dielectrics behavior. 3. Differentiate between ferroelectric, anti-ferroelectric, piezoelectric and pyroelectric materials. 4. Understand excitons, photoconductivity, types of

16.	PHY 304	Elective A Elective B Elective C	2017	<ol style="list-style-type: none"> 1. Learn the concept of lasers and their applications... 2. Understand the fundamental properties of lasers and laser systems 3. Know about the different optoelectronic devices and their behavior. 4. Aware of wide variety of applications of opto-electronic components. <ol style="list-style-type: none"> 1. Understand the fundamentals of solar energy, particularly the thermal energy component. 2. Acquire knowledge on solar radiation measurement techniques and procedures. 3. Demonstrate skills related collector performance analysis
17.	PHY 305	Elective	2017	
18.		A) Applied Spectroscopy-I	2017	<ol style="list-style-type: none"> 1. Gain experience with some statistics to analyse data in laboratory. 2. Handle the spectrophotometers and could analyse the data. 3. Identify the compounds based on qualitative analysis.
19.		B) Condensed Matter Physics-I	2017	<ol style="list-style-type: none"> 1. Minority charge carrier current in calculation of band gap 2. Analysis of magnetic materials in terms of coercivity and saturation magnetization, 3. Creep importance in materials characteristics analysis 4. Transition temperature determination by finding dielectric

20.		C) Electronics-embedded systems	2017	<ol style="list-style-type: none"> 1. Define the arithmetical and logical assembly language for microcontroller PIC 16F877A 2. Know the downloading procedure on hardware into flash ROM of PIC 16F877A
21.	PHY 306	A) Computational methods and Programming	2017	<ol style="list-style-type: none"> 1. Demonstrate both the theory and experiments related to propagation and modulation of light 2. Learn the optical fibre working 3. Design the Hologram 4. Propose and design new experiments based on the verification
22.		B)Energy Harvesting Systems	2017	<ol style="list-style-type: none"> 1. Demonstrate the skills related to measurement of direct, diffuse and global solar radiation. 2. Understand the working of a solar cell and its efficiency measurement 3. Verify the influence of different parameters on the solar cell
23.		C) Thin Films Physics	2017	<ol style="list-style-type: none"> 1. Understand the working of rotary and diffusion pumps. 2 Determine the thermos emf of any semiconductors. 3 Study the characteristics of any solar cells. 4. Demonstrate the skill acquired in connection with thin film
24.	PHY 307	Computational Methods and Programming	2017	<ol style="list-style-type: none"> 1. Write a C programme for analytical problems, algorithms for numerical problems and execute them. 2. Solve many problems including algebraic/transcendental equations, simultaneous equations, boundary value problems, data analysis, numerical differentiation and

25.	PHY 307(a)	ENERGY HARVESTING SYSTEMS	2017	<ol style="list-style-type: none"> 1. Gain knowledge on energy sources and economic development. 2. Understand the energy flow diagram and environmental
26.	PHY 401	Quantum Mechanics - II	2017	<ol style="list-style-type: none"> 1. Learn distinguishability and indistinguishability of identical particles, construct symmetric and anti-symmetric wave functions. 2. Grasp the concepts of spin and angular momentum as well as their quantization and addition rules.
27.	PHY 402	Advances in Physics	2017	<ol style="list-style-type: none"> 1. Understand the synthesis of nanomaterials, their application and impact on the environment. 2. Acquire the knowledge about MEMS and their applications. 3. Learn the basics of remote sensing, different payloads, sensors and satellite platforms.

28.	PHY 403	Elective A Elective B Elective C	2017	<ol style="list-style-type: none"> 1. Have the knowledge on crystal field theory and the effect of weak crystal field on S, P, D and F terms. 2. Understand the importance of rare earth doped materials and able to evaluate various laser parameters. 3. Know the instrumentation techniques used in various spectrophotometers and uses of various detectors. 4. Acquire the knowledge on two photon spectroscopy. <ol style="list-style-type: none"> 1. Learn the relation between stress and strain and gain knowledge on elastic constants and velocity of elastic waves. 2. Understand the classical and quantum theories of specific heat and also about Gruneisen parameter and lattice thermal conductivity. 3. Know the theories of different bands and experimental determination of Fermi surface.
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29.	PHY 404	Project work- Elective A Elective B Elective C	2017	<ol style="list-style-type: none"> 1. Learn the basics of fibre optic components, sensors and their applications. 2. Select appropriate fiber optic components for communication. 3. Understand the different components involved in optical signal processing. 4. Demonstrate their skills related to lasers, fiber optics, photonic and opto-electronic devices. <ol style="list-style-type: none"> 1. Understand the fundamental concepts of solar cells, manufacturing processes and limitations. 2. Acquire knowledge on cell efficiency study techniques and procedures for fault analysis. 3. Demonstrate skills related cell performance and fault analysis through hands on experience. 4. Comprehend the applications of solar photovoltaic energy in day-to-day applications
30.	PHY 405	Elective A) Applied Spectroscopy-II	2017	<ol style="list-style-type: none"> 1. Use standardized material to determine an unknown concentration. 2. Handle the spectrophotometers and could analyse the data.
31.		B) Condensed Matter Physics-II	2017	<ol style="list-style-type: none"> 1. Magnetic susceptibility determination, liquid crystal phases with temperature. 2. working of temperature sensor, heat capacity calculation.

32.		C) Electronics-Wireless communications	2017	<ol style="list-style-type: none"> 1. Understand and visualize the digital and optical modulation techniques. 2. Demonstrate the theoretical concepts in the laboratory. 3. Gain hands on experience and will be able to envisage the concepts more clearly.
33.	PHY 406		2017	<ol style="list-style-type: none"> 1. Get the experience on literature collection 2. Get the experience on selection of a problem independently related to recent work 3. Able to plan and execute the problem
34.		A)Analytical techniques and Nuclear Physics	2017	<ol style="list-style-type: none"> 1. Learn the basics and applications of analytical techniques. 2. Gain knowledge related to various spectroscopic techniques. 3. Get advanced knowledge in nuclear interactions in nuclear physics
35.		B) Nanomaterials and devices	2017	<ol style="list-style-type: none"> 1. Understand the classification of nano materials. 2. Know different synthesis methods to grow variety of nanostructures. 3. Describe allotropic forms of carbon and to understand

34. Psychology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	PSY 101	General Psychology-I	2017	<ul style="list-style-type: none"> To understand the concepts and scope of psychology To comprehend the biological basis of behavior To study the perception and learning theories
2	PSY 102	Social Psychology	2017	<ul style="list-style-type: none"> To understand the concepts of social psychology To comprehend the social perception and cognition. To study the socialization and attitudes
3	PSY 103	Psychopathology-I	2017	<ul style="list-style-type: none"> To understand the abnormal behavior and historical and current trends To comprehend the models of abnormal behaviour and approaches to therapies
4.	PSY 104	Psychological Measurements-I	2017	<ul style="list-style-type: none"> To understand the psychological measurements To comprehend the development of psychological tests and principles of test construction.
5	PSY 105P	Practical-I&II	2017	<ul style="list-style-type: none"> To understand the knowledge about psychological assessment To analyze the observed and the collected data to prove the theoretical
6.	PSY-106	Human Values and Professional	2017	

		Ethics-I		
7.	PSY 201	General Psychology-II	2017	<ul style="list-style-type: none"> • To understand fundamentals of motivation and emotion • To understand basic concepts of memory and forgetting • To comprehend the thinking, intelligence and personality of individuals
8.	PSY 202	Applied Social Psychology	2017	<ul style="list-style-type: none"> • To understand the Social Influence, Social Exchange Process in social behaviour. • To comprehend the Prejudice and Discrimination and group and individuals.
9.	PSY 203	Psychopathology-II	2017	<ul style="list-style-type: none"> • To understand anxiety and mood disorders and somatic disorders. • To study Psychosis and Cognitive Disorders across life span
10.	PSY 204a	Psychological Measurements & Statistics	2017	<ul style="list-style-type: none"> • To understand the psychological measurements • To comprehend the development of psychological tests and principles of test construction.
	PSY 204b	Research Methodology	2017	<ul style="list-style-type: none"> • To get knowledge of psychological tests and their use in diagnosis. • To make students able to diagnose patients with the help of projective tests.

				<ul style="list-style-type: none"> • To get understanding of different diagnostic systems. • Learn how to take case history of patients. • To be able to make differential diagnosis.
	PSY 204c	Computer Applications in Psychological Research	2017	<ul style="list-style-type: none"> • To understand the basic components of computer and working in Ms Office, power point and internet services. • To comprehend the application of computer knowledge through creating emails, scientific journals and data scoring
11	PSY 205P	Practical - I & II	2017	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
12	PSY 206	Human values and Professional Ethics-II	2017	
13	PSY 301	Lifespan Developmental Psychology - Infancy to Adolescence	2017	<ul style="list-style-type: none"> • To understand the scope of life span development of infancy and babyhood • To comprehend the Early and Late Childhood and Adolescence.
14.	PSY 302	Personality	2017	<ul style="list-style-type: none"> • To introduce nature of personality. • To help determinants and development. To understand the Assessment of personality

15	PSY 303	Counseling Psychology-I	2017	<ul style="list-style-type: none"> • To understand the meaning of counseling and ethics in counseling • To comprehend the process of counseling and techniques
16	PSY 304a	School Psychology	2017	<ul style="list-style-type: none"> • To introduce nature of school psychology • To help children with emotional, social, and academic issues. • To collaborate with parents, teachers, and students to promote a healthy learning environment.
	PSY 304b	Organizational Behaviour and HRM	2017	<ul style="list-style-type: none"> • To understand organization and the Individual differences • To comprehend the motivation and leadership To study the decision making and organizational effectiveness.
	PSY 304c	Health Psychology	2017	<ul style="list-style-type: none"> • To understand the need of Health psychology and various models related to health and illness. To comprehend the health behaviour enhancement and management
	PSY 304d	Psychology of Disability	2017	<ul style="list-style-type: none"> • To understand historical development – Models of disabilities in the past and present scenario To comprehend Learning and behavioral disability, Needs and concerns of disabled in all groups

17	PSY 305P	Practical - I & II	2017	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
18	PSY 306	Personality Development (OE)	2017	<ul style="list-style-type: none"> • To study the biological, psychological and socio cultural determinants & Soft Skills • To help determinants and development. • To understand the Assessment of personality
19	PSY 401	Lifespan Developmental Psychology – Adulthood and Later Maturity	2017	<ul style="list-style-type: none"> • To understand the scope of life span development of Adulthood and Later Maturity. • To comprehend the Adulthood and Later Maturity.
20	PSY 402	Theories of Personality	2017	<ul style="list-style-type: none"> • To introduce nature of personality. • To help determinants and development. • To understand the Assessment of personality
21	PSY 403	Counseling Psychology - II	2017	<ul style="list-style-type: none"> • To understand the meaning of counseling and ethics in counseling • To comprehend the process of counseling and techniques
22	PSY 404a	Psychology of Aging – Applied Aspects	2017	<ul style="list-style-type: none"> • To study and understand the aging from maturity to old age. • A form of discrimination against older adults based on their age.

				<ul style="list-style-type: none"> • To notice gerontology and issues
	PSY 404b	Consumer Behaviour and Marketing	2017	<ul style="list-style-type: none"> • To understand concept of consumer behaviour and market research • To comprehend the economic, social and psychological theory of buying motives. • To study the effect of advertising, sales promotion, branding and packaging
	PSY 404c	Rehabilitation Psychology	2017	<ul style="list-style-type: none"> • To understand historical development – Models of disabilities in the past and present scenario • To comprehend Learning and behavioral disability, Needs and concerns of disabled in all groups
23	PSY 405P	Practical I & II	2017	<ul style="list-style-type: none"> • To understand the knowledge about psychological assessment • To analyze the observed and the collected data to prove the theoretical
24	PSY 406	Life Skills (OE)	2017	<ul style="list-style-type: none"> • To learn the concept of life skills and its importance in relation to personality development of an individual. • To become aware of the components of life skills and the method of imparting knowledge of life skills.

COUNSELLING PSYCHOLOGY:

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	PSY 101	General Psychology-I	2017	<ol style="list-style-type: none"> 1. Understood the concepts and scope of psychology 2. Comprehended the biological basis of behavior 3. Studied the perception and sensation
2	PSY 102	Social Psychology	2017	<ol style="list-style-type: none"> 1. Understood the concepts of social psychology 2. Comprehended the social perception and cognition. 3. Studied the Socialization
3	PSY 103	Psychopathology-I	2017	<ol style="list-style-type: none"> 1. Understood the meaning abnormal behavior and historical and current trends 2. Comprehended the models of abnormal behaviour and approaches to therapies 3. Learned about classification and assessment of abnormal behaviour
	PSY 104	Psychological Measurements-I	2017	<ol style="list-style-type: none"> 1. Understood the assessment and psychological measurements 2. Comprehended the development of psychological tests and principles of test construction. 3. Learned the Principles of Test Construction

	PSY 201	General Psychology-II	2017	<ol style="list-style-type: none"> 1. The students understood the fundamentals of motivation and emotion 2. They understood the basic concepts of memory and forgetting 3. Comprehended the thinking and intelligence 4. Able to evaluate the personality of individuals
	PSY 202	Applied Social Psychology	2017	<ol style="list-style-type: none"> 1. Students understood about Social Influence 2. Acquainted with social exchange process in social behaviour. 3. Comprehended the prejudice and discrimination 4. To understand what is psychological groups and individuals.
	PSY 203	Psychopathology-II	2017	<ol style="list-style-type: none"> a. Understood anxiety and mood disorders b. Acquainted with somatic disorders. c. Studied Psychosis and Cognitive Disorders d. Understood Psychological Disorders Across the Life Span

	PSY 204	<p>a. Psychological Measurements & Statistics</p> <p>b. Research Methodology</p> <p>c. Computer Applications in Psychological Research</p>	2017	<ol style="list-style-type: none"> 1. The students acquainted with intelligence and achievement tests 2. The students learned the measurement of personality tests 3. They are clear in understanding the Statistics for Psychological Measurement 4. They have knowledge on Distribution of Scores on Variables <ol style="list-style-type: none"> 1. Understood basic research and applied research including experimental research. 2. The students comprehended the problem & hypothesis 3. Gained knowledge on Sampling & Data Collection 4. Understood the application of research designs <ol style="list-style-type: none"> 1. Understood the basic components of computer 2. Acquainted with Ms Office, power point and internet services. 3. Comprehended the application of computer knowledge through creating emails, scientific journals and data scoring 4. Able to understand Statistical Packages and its application
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	CPSY 301	Counselling Process	2017	<ol style="list-style-type: none"> 1. Understood the counseling as helping profession 2. To acquire the relation with other helping professions 3. To know the legal and ethical issues
	CPSY 302	Counselling Skills	2017	<ol style="list-style-type: none"> 1. Understood the micro-skills of counseling through a series of practices. 2. Got an idea about who to understand the people and interpret their feelings with positive appreciation 3. To provide a space where participants can grow, in the sense of allowing an encounter with them first and based on this encounter to achieve a better understanding of how they impact on other people. 4. The ability to examine and assess the clients with scientific manner.
	CPSY 303	Therapeutic Approaches in Counselling –I	2017	<ol style="list-style-type: none"> 1. Understood the various Therapeutic Approaches of counseling. 2. Understood the techniques relevant to therapies. 3. To acquires the basic procedures. 4. Learned how to touch in the insight of the client

	CPSY 304A	a. Foundations of Personality	2017	<ol style="list-style-type: none"> 1. Understood nature of personality. 2. Realized the determinants of personality 3. Found that the development of Personality. 4. Understood the Assessment of personality
	CPSY 304B	b. Lifespan Developmental Psychology – Infancy to Adolescence	2017	<ol style="list-style-type: none"> 1. Exposed the students to the basics of human development 2. Helped the student understand the stages of development 3. Understood the biological, social and emotional development 4. Able to evaluated the behavior of the individual at various stages.
	CPSY 304C	c. Psychology of Disability	2017	<ol style="list-style-type: none"> 1. Understood the historical development and models of disabilities 2. Acquire the knowledge of assessment of disability. 3. Expertised on handling the disabled Behavior 4. Collected the knowledge about various service organizations

	CPSY 305	Practical I & II	2017	<ol style="list-style-type: none"> 1. Studied biological, psychological determinants 2. The students aware of socio cultural determinants & Soft Skills 3. The students acquainted with soft skills 4. They learned more on Soft skills
	CPSY 401	Applications of Counselling in Special Areas	2017	<ol style="list-style-type: none"> 1. Understood how to handle the client with various problems and hailing into different age groups. 2. Learned how to handle the clients with specific problems 3. To attained what is career, personal, vocational and other applied areas of counseling 4. Gained how to organize Counseling programs to handle special concerns in Different social settings.
	CPSY 402	Therapeutic Approaches in Counselling –II	2017	<ol style="list-style-type: none"> 1. Understood the therapeutic approaches of counseling 2. Improve the major skills in therapeutic techniques 3. Gained specific methods involved in therapy 4. Adopted the different psycho therapeutic models of counseling.

	CPSY 403	Family Counselling	2017	<ol style="list-style-type: none"> 1. Understand the need and importance of family counseling. 2. Improved how to handle the family issues 3. To maximized use of tools in counseling 4. Learned the specific skills to handle family issues.
	CPSY 404A	a. Theories of Personality	2017	<ol style="list-style-type: none"> 1. Understood the Psychoanalytic Approach 2. Learned on behavioural approaches to personality. 3. The students comprehended the Humanistic approach 4. The students acquainted with the eastern theories of
	CPSY 404B	b. Lifespan Developmental Psychology – Adulthood and Later Maturity	2017	<ol style="list-style-type: none"> 1. Understood about adult hood 2. Aware of infancy late adult hood problems 3. Identified the early and late old age issues. 4. Acquired the developmental tasks at all ages.
	CPSY 404C	c. Rehabilitation Psychology	2017	<ol style="list-style-type: none"> 1. The students understood historical development – Models of disabilities in the past and present scenario 2. The students comprehended Assessment of Disability, Psychological Aspects 3. The students are aware of Behavioral Management

	CPSY 405	Practical I & II	2017	<ol style="list-style-type: none"> 1. Learned the concept of life skills and its importance in relation to personality development of an individual. 2. They became aware of the components of life skills and the method of imparting knowledge of life skills. 3. The students have learned more on Life Skills in Specific 4. They acquainted with Self management skills
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35. Statistics

S.No	Course Code	Title of the Course	Years of	Course Outcomes
		ST - 101	Introduction Linear Algebra	2017

		ST - 102	Probability Theory	2017
		ST - 103	Distribution Theory	2017
		ST - 104	Practical-I (75 Practical + 25 Record)	2017

		ST - 105	Statistical Computing	2017
		ST - 106	Human Values and Professional Ethics-I	2017
		ST - 201	Statistical Inference	2017

		ST - 202	Multivariate Analysis	2017
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		ST-203 A & B & C	(a) Linear Models and Applied Regression Analysis (b) Stochastic Processes (c) Mathematical Analysis	2017
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		ST - 204	Practical-II (75 Practical + 15 Viva- voce + 10 Record)	2017
		ST - 205	Sampling Techniques	2017
		ST - 206	Human Values and Professional Ethics-II	2017

		ST - 301	Econometric Methods	2017
		ST - 302	Design and Analysis of Experiments	2017
		ST -303	Operations Research-I	2017

		ST -304	Practical-III (75 Practical + 25 Record)	2017
		ST-305A	(a)Bio-Statistics	2017
		ST - 306	(a) Statistics for Biological and Earth Sciences	2017

		ST - 401	Time Series Analysis and Forecasting Methods	2017
		ST - 402	Demography and Official Statistics	2017
		ST - 403	Operations Research-II	2017

		ST - 404	Practical-IV (75 Practical + 15 Viva-voce + 10 Record)	2017
		ST-405 A	(a) Statistical Process and Quality Control	2017
		ST-405 B	Statistics for research, industry and Community devel opment	2017

		ST-405 C	Advanced Econometric Models	2017
		ST - 406 A	Business Analytics	2017

		ST-406 B	(b) Survival Analysis	2017
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Applied Statistics

S.No	Course Code	Name of the Course	Year of introduction	Course outcomes
1. 1	APST - 101	Linear Algebra	2017	<ol style="list-style-type: none"> 1. Students understood for estimation of elementary transformations in matrix and their solutions. 2. Students learnt about characteristic roots and vectors with numerical examples. They also know theoretical proofs of theorems. 3. Discriminate between diagonalizable and non-diagonalizable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms 4. Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in specific bases

2.	APST - 102	Probability Theory	2017	<ol style="list-style-type: none"> 1. Students must have knowledge about random variables, expectations, sets and their properties and inequalities where ever necessary. 2. Students also know the weak law, strong law and central limit theorem and their importance. 3. Students get the knowledge of the Central limit theorem and their real life uses. 4. Students can get the knowledge of the inequalities of probability and their uses.
3.	APST - 103	Distribution Theory	2017	<ol style="list-style-type: none"> 1. Students know about different continuous and discrete distributions and their properties. 2. They have awareness about central and non-central sampling distributions and order Statistics. Idea about simple, partial and multiple correlation coefficients. 3. Students get the knowledge of the statistical Tests and their real life uses and applications. 4. Students get the knowledge of Regression and Correlations and their real-life applications

4.	APST - 104	Practical-I (75 Practical + 25 Record)	2017	<ol style="list-style-type: none"> 1. Numerical problems related to, Linear Algebra and Sampling Techniques are solved by executing programs of computers. 2. Linear algebra concepts when working with data preparation, such as one hot encoding and dimensionality reduction. 3. Applying linear algebra problems in real life situations. 4. Perform sampling methods analysis using R-software.
5.	APST - 105	Statistical Computing	2017	<ol style="list-style-type: none"> 1. Students get the basic Programming Skills of C and C++. 2. Students learnt how the Data entre in the Excel with Headings. 3. Students get the knowledge of creating data ase using the MS-Access. 4. Students get the knowledge how to create the reports using MS-EXCEL and MS ACCESS.
6.	APST - 106	Human Values and Professional Ethics-I	2017	<ol style="list-style-type: none"> 1. Students get the knowledge of the Ethical values. 2. Students get the idea about the Value education. 3. Students learn how to behave in Society. 4. Students get the knowledge of the Bhagavat Geetha and Can apply in their life's.

7.	APST - 201	Statistical Inference	2017	<ol style="list-style-type: none"> 1. Students know about point estimation, non-parametric models, Game theory, theorems and Proofs where ever necessary. 2. They can understand the concept of random sample from a distribution, sampling distribution of statistic, standard error of important estimates such as mean and proportions. 3. Students may gain the knowledge of testing of hypotheses (both large sample test and small sample test). 4. They can also calculate the problems related to point estimation and interval estimation.
8.	APST - 202	Multiariate Analysis	2017	<ol style="list-style-type: none"> 1. Students learnt about importance of multivariate variables and their distributions 2. T^2, D^2, MANOVA models are understood and know it's importance. 3. Implement dimension reduction techniques using software on real life problems.

9.	APST-203 & B & C	A(a) Linear Models and Applied Regression Analysis (b) Stochastic Processes (c) Mathematical Analysis	2017	<p>A. Linear Models and Applied Regression Analysis</p> <ol style="list-style-type: none"> 1. Students learnt about different linear and non-linear regression models and their appropriate computational procedures. 2. They know R^2, adjusted R^2 and C_p criteria for model selection. 3. They will get the knowledge of building and fitting linear regression models with software. <p>They also learn about the theory underlying point estimation, hypothesis and confidence intervals for linear regression models.</p> <p>(b) Stochastic Processes</p> <ol style="list-style-type: none"> 1. Students understood stochastic processes, Markov chains, Poisson process, Renewal theory, Branching process, etc. 2. Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations. 3. Understand the consequences of the Intermediate value theorem for continuous function. 4. Know the chain rule and use it to find derivatives of composite functions and obtain expression for higher order derivatives of a function using the rule of differentiation. Solve integrals and evaluation of multiple integrals with numerical problems. <p>(c) Mathematical Analysis</p> <ol style="list-style-type: none"> 1. Students get the knowledge of real no.'s and set theory and their
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10.	APST - 204	Practical-II (75 Practical + 15 Viva- voce + 10 Record)	2017	<ol style="list-style-type: none"> 1. Students know about the solving of Numerical problems related to Multivariate data. 2. Students can learn how the Statistical tests uses in their real life's by doing the tests on the Real times Data. 3. They can also use the statistical tools and techniques for analyzing the statistical data.
11.	APST - 205	Sampling Techniques	2017	<p>Students can solve the agriculture related problems using the</p> <ol style="list-style-type: none"> 1. Students learnt different sampling techniques of with replacement/ without replacement and Different sampling models. 2. Students studied non-Sampling errors and different remedies. 3. Implement Cluster sampling, Ratio and Regression estimation in real life problems
12.	APST - 206	Human Values and Professional Ethics-II	2017	<ol style="list-style-type: none"> 1. Students get the Knowledge of Status of Women in the family and society. 2. Students get the idea of the Medical Rights and Their responsibilities in the medical practitioners. 3. Students get the idea about the environmental Ethics. 4. Students Get the knowledge of Human Rights.

13.	APST - 301	Applied Econometrics	2017	<ol style="list-style-type: none"> 1. Students learnt heteroscedasticity, multicollinearity and autocorrelation and their estimation procedures. 2. Students understood about different lag models and simultaneous linear equations model with their estimation methods. 3. Explain core concepts and techniques in econometrics, with a special focus on the classical linear regression model. 4. Understand the assumptions upon which different
14.	APST - 302	Experimental Design and Applications	2017	<p>Students learnt ANOVA, ANCOVA technique for one way and two-way classifications. Multiple comparisons tests using Tukey's, Duncans, Sheffe's and Dunnet's tests.</p> <p>Students understood about Latin squares and their construction, missing plot technique etc.</p> <p>Students explained about Incomplete Block Designs and their analysis, etc.</p> <p>Understand the basic terms used in design of experiments by using</p>
15.	APST -303	Applied Operations Research	2017	<ol style="list-style-type: none"> 1. Students understood about Dual primal, Revised simplex methods. 2. Students learnt non-linear programming, integer programming, CPM, PERT, different models of games. 3. Students can think the real-life problems in the way of Linear Programming Problems and try to solve the problems in Mathematical Way.

16.	APST -304	Practical	2017	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. 4. Students can understand how the statistics use in biological aspects.
17.	APST-305A	(a)Bio-Statistics	2017	<ol style="list-style-type: none"> 1. Students learnt about biological assay, their distribution and theorems, dose response relationships, basic concepts of biological assay, estimation methods of gene frequencies, etc. 2. Describe single and multi-species population growth models. 3. Apply the concept of deterministic and stochastic models on simple and general epidemics. 4. Understand linearization of dynamical systems with various dimensions.

18.	APST - 306	(a) Statistics for Biological and Earth Sciences	2017	<p>a) Statistics for Biological and Earth Sciences</p> <ol style="list-style-type: none"> 1. Students learnt about Graphs, measures of averages, measures of dispersion etc. 2. Students understood about Basic probability and important distributions with workout examples. 3. Students used t, F, χ^2, ANOVA and ANCOVA and non-parametric tests with examples. 4. Students used Advanced statistics tools with working illustrations.
19.	APST - 401	Applied Forecasting Methods	2017	<ol style="list-style-type: none"> 1. Students understood Time series analysis with some important growth models and their fitting 2. Students forecasting using regression, non-linear regression techniques, single, double, triple and adoptive exponential smoothing models. 3. Students obtained knowledge on AR, MA, ARMA, ARIMA, models fitting, diagnostic checking, etc. 4. Check and validate models with its residual analysis and diagnostic checking.

20.	APST - 402	Applied Demography and Official Statistics	2017	<ol style="list-style-type: none"> 1. Students know the growth rates, life tables, GRR, NRR and growth models. 2. Students understood about gene frequencies, genotypes, phenotypes etc. 3. Students learnt about population census methods, organizations in India and their functions. 4. Useful to students as a means of analyzing and predicting social, cultural, and economic trends related to population.
21.	APST - 403	Reliability Theory & Survival Analysis	2017	<ol style="list-style-type: none"> 1. Students learnt about and survival analysis with their related distributions, relationships, non-parametric methods for computing survival analysis. 2. Estimate nonparametric survival function of the data. 3. Explain test of exponentiality against nonparametric classes, two sample problems. 4. Understand the elements of reliability, hazard function and its applications.

22.	APST - 404	Practical-IV (75 Practical + 15 Viva-voce + 10 Record)	2017	<ol style="list-style-type: none"> 1. Students can understand the Statical Methos in Economical Views. 2. Students solved the Numerical problems related to operations research. 3. Students Understand the Life Tables in Demography. 4. Students can understand how the statistics use in biological aspects.
23.	APST-405 A	(a) Statistical Process and Quality Control	2017	<ol style="list-style-type: none"> 1. Students understood the basic concepts of control charts for variables and their indices. 2. Students performed different control charts like Shewart's moving average, multivariate etc. with their applications. 3. Students used different sequential sampling plans and six sigma tool etc. in solving the problems. 4. Students have awareness about Total Quality Management.
24.	APST-405 B	Statistics for research, industry and Communitydevelopment	2017	<ol style="list-style-type: none"> 1. Students have done Simulation models, response surface models, demand analysis, social survey and their related measures. 2. Students can understand the basic of research blooms taxonomy of learning levels. 3. Find the topic from current research in statistics education. 4. Students can apply the tools in design, research and

25.	APST-405 C	Actuarial Statistics	2017	<ol style="list-style-type: none"> 1. Students get the knowledge of the Economic interest rates and discount rates. 2. Students know how to construct the life tables based on the Expectancy. 3. Students to get awareness of the life annuities. 4. Students ensure how to build joint life annuities and life survivor annuities.
26.	APST - 406 A	Statistics for Marketing Research	2017	<ol style="list-style-type: none"> 1. Students learnt about Research design and how to frame questionnaire etc. 2. Statistics relating to research like univariate test like Z, t, F, ANOVA, CRD, RBD and LSD are done. 3. Multivariate statistical techniques like factor analysis, dissemination analysis and cluster analysis are used. 4. Students can understand how the marketing is happening in the real life.

27.	APST-406 B	(b) Statistical analysis using SPSS	2017	<ol style="list-style-type: none"> 1. Able to create and manipulate vectors, matrices, arrays, data frames and lists. 2. Should be able to work with character data, factor data and dates. 3. Able to write scripts and function in R and read data from .csvfiles, EXCEL files and SPSS files.
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36. Virology

S. No.	Course Code	Title of the Course	Years of Introduction	Activities/Content with direct bearing on Employability/Entrepreneurship /Skill development
1	VR-101	General Microbiology	2017	<ul style="list-style-type: none"> - To learn about fundamentals aspects of microbiology including origin, evolution of microorganisms, different groups of microorganisms and their importance, microscopy principles and applications, morphology, and structure of bacteria, - To learn about Microbiological media, isolation, cultivation and enumeration methods of microorganisms, microbial growth characteristics, maintenance, and preservation of microbial cultures. - To develop knowledge on microbial taxonomy, transport of nutrients in microbes, control strategies of microorganism,

				<ul style="list-style-type: none"> - To develop knowledge on general characteristics, structure and reproduction of fungi, algae, and protozoan parasites.
2	VR-102	General Virology	2017	<ul style="list-style-type: none"> - Learn the discovery, nature, origin and evolution of viruses and the physical, biochemical, and biological properties of viruses, criteria used for nomenclature and classification of bacteria, plant and animal viruses. - Describe the methods used for isolation, cultivation, and purification of viruses and criteria of purity. - Define biological, physical, biochemical, and serological methods used for quantitation of viruses, major characteristics of important plant and animal virus families and biology and applications of major RNA and DNA viruses of insects. - Understand the biology of major bacteriophages, algal and fungal viruses, subviral agents and importance of viruses in human welfare with suitable examples.

3	VR-103	General Microbiology and Virology	2017	<ul style="list-style-type: none"> - Define laboratory safety measures that needs to be followed in Virology and Microbiology laboratories and know the concepts and protocols of using different sterilization methods and preparation of media. - Acquire the practical skills to use various methods for cultivation, staining and characterization of different microorganisms and to check their stability under various conditions. - Learn to isolate bacteriophages from different sources and cultivate viruses in embryonated eggs and plants. - Demonstrate the mechanical, aphid and graft transmission of plant viruses and methods used to check the stability of viruses and determine the effect of virus infection on plants through chlorophyll estimation.
4	VR-104	Biological Chemistry and Analytical Techniques	2017	<ul style="list-style-type: none"> - : Learn to calculate normality, molarity, molecular weight and percentage of chemical substances and qualitative and quantitative estimation of proteins, carbohydrates, lipids, and nucleic acids. - Know how to isolate and check the activity of enzymes from various

				<p>sources.</p> <ul style="list-style-type: none"> - Learn to use ultrafiltration, chromatography, and electrophoresis techniques for isolation and characterization of biomolecules. - Acquire the skills to use spectroscopic and centrifugal methods for isolation and characterization of biomolecules apply this practical oriented knowledge in Cell Biology and Immunology to foster employability in private industries, higher education in premier institutes.
5	VR-105	Biological Chemistry and Analytical Techniques	2017	<ul style="list-style-type: none"> - Acquire knowledge on major elements and biomolecules of life and their chemical composition, bonding and primary characteristics, classification, structure, functions of carbohydrates, nucleic acids, amino acids, peptides, proteins and lipids and mechanism of protein synthesis and degradation. - Understand the types, properties, biological functions of enzymes, nucleic acids, hormones, growth regulators, vitamins, porphyrins and other pigments and nucleic acid metabolism. - Describe the approaches involved in characterization and concentration of biomolecules and discuss the principles and applications of various techniques applied for characterization of biomolecules in biological research such as chromatography,

				<p>centrifugation, electrophoresis,</p> <ul style="list-style-type: none"> - Learn about electrochemical techniques, basic principles and applications of flow cytometry, radioisotopes, spectroscopy, amino acid, and nucleotide sequencers
6	VR-106	Human values and Professional ethics - I	2017	<ul style="list-style-type: none"> - To enable the students to imbibe and internalize the moral values and ethical principles - 2. To learn ethics moral and social values and ethical behavior in the personal and Professional lives. - 3.To learn the rights and responsibilities and to appreciate the rights of others and to create awareness on religious values and other good acts and facts of life. - 4.To acquire knowledge about the important facts of Bhagavad Gita, values hidden in religions, religious tolerance and aware of crime, and punishment theories
8	VR-201	Microbial Genetics and Molecular Biology	2017	<ul style="list-style-type: none"> - To gain understanding of prokaryotic and eukaryotic genome organization, modern concept of genes, plasmids, mobile genetic elements - To learn gene transfer and mapping mechanisms in bacteria, genetics of viruses and requirements and mechanism of DNA replication. - To attain knowledge about the mechanism of DNA damage and repair, concept of mutations and their importance, processes involved

				<p>in transcription,</p> <ul style="list-style-type: none"> - To attain knowledge about the mechanism of translation, regulation of gene expression and gene silencing mechanisms.
9	VR-202	Recombinant DNA Technology	2017	<ul style="list-style-type: none"> - To learn basic and advanced tools and techniques, approaches and strategies used in gene manipulation in prokaryotic and eukaryotic systems. - 2. To learn the major techniques and applications of gene manipulation such as DNA sequencing, nucleic acid hybridization - 3. To understand the strategies used for gene expression in heterologous hosts, proteomics, genomics. - 4. To generate knowledge on genetically modified plants and animals and applications/implications of genetic engineering in agriculture, medicine, industry, and biology.
10	VR-203	Microbial Genetics and Molecular Biology & Recombinant DNA	2017	<ul style="list-style-type: none"> - Learn the safety practices and precautions to be followed in setting up Cell and Molecular Biology laboratory with ribonuclease free environment. - Isolate and estimate DNA and RNA from microbial, plant and animal tissues and demonstrate curing of plasmids, replica plating techniques,

		Technology		<p>conjugation in bacteria, Ames test, induction of mutations in bacteria by physical/chemical agents, isolation of microbial mutants by gradient plate method.</p> <ul style="list-style-type: none"> - Acquire practical skills to isolate plasmids from bacteria, restriction enzyme digestion of recombinant plasmid DNA, recovery of DNA from gels, transformation of bacteria and demonstrate the preparation of southern and dot blots for hybridization. - Solve the problems related to Molecular Genetics/Biology and Recombinant DNA Technology and compete for the competitive exams such as UGC-CSIR-NET, GATE, APSET and other scientific examinations.
11	VR-204	Cell biology and Immunology	2017	<ul style="list-style-type: none"> - Acquire the practical skills in conducting various experiments related to Cell Biology such as isolation of cells, preparation of cell cultures. - Learn isolation of mitochondria, study of chromosomes, identification of stages of mitosis in onion root tips. - Identify of primary and secondary lymphoid organs in virtual animal model and illustrate basic immunology techniques such as counting of

				<p>RBC and WBC, estimation of hemoglobin, identification of the blood groups and Rh.</p> <p>- Demonstrate antigen-antibody interactions by conducting <i>in vitro</i> serological tests such as immunodiffusion and immune-electrophoresis, DAC-ELISA, Dot-ELISA and western blotting and apply this practical oriented knowledge in Cell Biology and Immunology to foster employability in private industries, higher education in premier institutes.</p>
12	VR-205	Cell biology and Immunology	2017	<p>1.To understand the structure and contents of prokaryotic and eukaryotic cells, general principles and pathways of cell communication and cell signaling.</p> <p>2. To describe the concepts and methodologies of plant and animal tissue and organ cultures, cell counting and introduction to stem cell cultures.</p> <p>3..To learn about the historical perspectives of immunology, innate and adaptive immunity mechanisms, various components of immune system, antigens, antibodies, <i>in vitro</i> and <i>in vivo</i> antigen and antibody interactions and</p> <p>4.To understand the mechanism of humoral and cell mediated immune responses, immune effector mechanisms, MHCs, hypersensitivity reactions, autoimmune and immunodeficiency disorders, transplantation and transfusion immunology and concepts and applications of conventional and modern</p>

				vaccines.
13	VR-206	Human values and Professional ethics - II	2017	<ul style="list-style-type: none"> - Understand the definition of value education, concept of human and family values, components, structure, and responsibilities of family system and acquire reflective thinking, rational skepticism. - Describe the moral responsibilities and ethical issues of medical and health care professionals, avoid unethical things, learn ethical issues raised in genetic engineering and new biological technologies. - Learn to practice ethical standards in business by understanding ethical theories and maintain work ethics to build trust between businessman and consumer and avoid unethical behavior and ethical abuse and develop scientific temper, digital literacy. - Learn to practice environmental ethics by taking responsibility to protect environment and ecosystem and understand the importance of maintenance of social ethics and ethics of media.
14	VR-301	Plant Virology	2017	<ul style="list-style-type: none"> - Understand the induction of plant virus diseases, virus-host interactions and movement strategies. - Learn the vector and non-vector modes of plant virus transmission,

				<p>virus-vector relationships and molecular mechanisms involved in virus vector interactions and the approaches used for identification and characterization of the viruses and virus strains.</p> <ul style="list-style-type: none"> - Acquire the knowledge on plant virus spread and survival in nature and approaches used to detect plant viruses and diseases. - Describe the approaches used for the control and management of plant viruses and vectors and strategies used for acquiring plant virus resistance.
15	VR-302	Plant Viruses and Diseases	2017	<ul style="list-style-type: none"> - To understand the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of cereals and millets, oil seed crops - To understand the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of vegetable, and tuber crops. - To acquire knowledge on the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of food legumes, fruit crops - To acquire knowledge on the distribution, incidence and impact, symptoms, causal virus characteristics, diagnosis, disease cycle and management of the virus diseases of cash, spice and beverage crops

				and flowering and foliage ornamentals.
16	VR-303	Plant Virology or Plant Viruses and Diseases	2017	<ul style="list-style-type: none"> - Identify major virus diseases of local economically important crop plants and weeds through theory exercises, local field surveys, agricultural research station visits. - Determine and compare the effect of virus on cell size, chloroplast number, total carbohydrates, proteins, and lipids with healthy counterparts. - :Detect unknown viruses through ELISA and PCR (theory exercise and practical) and demonstrate plant virus transmission by seed and vegetative propagules and generation of virus free plants through apical meristem tip culture. - Identify local plant virus vectors, determine virus disease incidence, and progress curves through local field visits. -
17	VR-304	a) Molecular Virology (OR)	2017	<ul style="list-style-type: none"> - Acquire the skills to use the techniques involving purification of viruses such as maintenance of virus cultures on propagation hosts, clarification using organic solvents and low speed centrifugation,

		b) Biostatistics and Bioinformatics		<p>precipitation using sodium chloride or ammonium sulphate or polyethylene glycol or differential centrifugation, preparation of step and linear density gradients, further purification of viruses using sucrose density gradient centrifugation and final pelleting by ultrafiltration or ultracentrifugation and to check the quality and quantity of viruses using spectroscopy or transmission electron microscopy.</p> <ul style="list-style-type: none"> - Isolate virus coat proteins and determine its quantity and molecular weight through spectroscopy and SDS-PAGE, respectively. - Isolate virus nucleic acids (dsRNA, RNA and DNA), estimate their quantity by spectroscopy, determine their size and molecular weight through agarose gel electrophoresis. Determine the stability of virus by studying effect of physical and chemical agents on virus inactivation.
18	VR-305	(a) Molecular Virology (OR) (b) Biostatistics and	2017	<ul style="list-style-type: none"> - To understand molecular architecture of viruses and molecular mode of inactivating agents on viruses - To learn about types of viral genomes and steps involved in virus replication and replication strategies of DNA viruses. - 3.To understand basic concepts of statistics, construction of

		Bioinformatics		<p>histogram, normal distribution, mean, median and standard deviation, comparison of means and variances, examples of proportion and count data</p> <ul style="list-style-type: none"> - 4.To learn about analysis of variance, correlation and regression and statistical parameters for biological assays.
19	VR-306	<p>(a) Biology of Viruses and their Management</p> <p>(OR)</p> <p>(b) Biology of Virus Vectors and their Management</p>	2017	<ul style="list-style-type: none"> - To understand the basics of general entomology, collection, preservation, maintenance and transportation of virus vectors and vector-borne viruses of animals and humans - To learn about the biology and ecology of mosquitoes, blood sucking mites and prevention and control methods of animal and human virus vectors in urban and rural settings. - To describe the methods of collection, culturing and identification of plant virus vectors, virus vector transmission mechanisms, - To learn about the soil-borne vectors, epidemiology of vector-borne viruses, management of plant virus vectors and concepts of vector resistant crops
20	VR-401	Animal and Human Virology	2017	<ul style="list-style-type: none"> - To acquire knowledge on virus-host interactions, host innate and adaptive immune response to viruses, molecular mechanisms of viral pathogenesis, - To acquire knowledge on transmission of viruses, mechanism of virus, persistence, infection and spread in the body.

				<ul style="list-style-type: none"> - To learn the epidemiological concepts and methods of virus diseases, measures of disease occurrence, disease determinants, ecology, epidemiology - To learn the surveillance of virus diseases, strategies of virus maintenance in communities, basic concepts, types and patterns of disease survey, prevention, and control methods of viruses.
21	VR-402	Animal and Human Virus Diseases	2017	<ul style="list-style-type: none"> - Learn the safety practices and To describe the etiology, transmission, clinical manifestations, diagnosis, prevention and control of important (+) sense ssRNA viruses infecting animals and humans. - To describe the etiology, transmission, clinical manifestations, diagnosis, prevention and control of important (-) sense ssRNA viruses infecting animals and humans - To understand the etiology, transmission, clinical manifestations, diagnosis, prevention, and control of important DNA viruses infecting animals and human - To learn about the prion diseases, biology, prevention, and management of major viruses of silkworm, poultry, fish and prawn, emerging and reemerging virus diseases. -
22	VR-403	Animal and Human Virology	2017	<ul style="list-style-type: none"> - Understand the biosafety, biosecurity, and ethical guidelines to be followed in the Molecular Virology laboratory.

		& Animal and human virus diseases		<ul style="list-style-type: none"> - Learn the technologies related to preparation of media for cell/tissue cultures, preparation of cell cultures/embryonated eggs for virus cultivation and isolation and quantitation of viruses using differential centrifugation and symptomatology/spectroscopy, respectively. - Develop skills to test the plant and human viruses using serological and molecular tests and kit-based methods. - Acquire knowledge on virus-based nanotechnology protocols, virus epidemiology by doing extension activities and visiting field, poultry, agriculture research station and aqua forms.
23	VR-404	Project work related to Virology (OR) (a) Applied Virology (OR)	2017	<ul style="list-style-type: none"> - Acquire the skills to prepare the cell cultures and embryonated eggs for cultivation of plant, animal and human viruses and to isolate and quantitate viruses. - Learn the methods to detect plant and animal viruses and able to analyze various types of results obtained from serological and molecular viral diagnostic methods. - Apply the skills acquired to prepare NPV as biopesticides and virus-based nanoparticles and their isolation using analytical methods. - Participate in extension activities and field, poultry, agriculture

				<p>research station and aqua form visits.</p> <ul style="list-style-type: none"> -
		(b)Tumor Biology and Viruses		<ul style="list-style-type: none"> - Acquire skills to detect carcinogens and mutagens using standard tests such as Ames test. - Distinguish transformed and normal cell lines and determine the anticancer property of biologically active compounds. - Design and execute PCR and other point of care methods using commercial kits for detection of tumor viruses (HCV, HIV, HPV). - Perform cultivation of poultry tumor viruses in cell cultures and acquiring the knowledge on histopathology of animal tumor viruses. -
24	VR-405	(a) Applied Virology (OR)	2017	<ul style="list-style-type: none"> - Understand the basic concepts, types, requirements and methodologies of plant/animal cell and tissue cultures used for cultivation of plant and animal viruses. - Learn the production of recombinant DNA technology-based antibodies and vaccines to viruses and the concepts and methods of production of virus resistant/tolerant crops and virus-based biopesticides.

				<ul style="list-style-type: none"> - Acquire knowledge about common virus infections caused to human beings through vector and non-vector borne modes and basic principles of biosafety, biosecurity, and ethical/regulatory issues in Virology and basics in Intellectual Property Rights (IPR). - Understand the utilization of viruses as viral genes/sequences as unique genetic resources, novel enzymes, gene expression activators and silencers, gene delivery systems, epitope display platforms and model systems in understanding the replication of nucleic acids and regulation of gene expression strategies and cancer biology, phage display and therapy technologies and viruses as biological weapons.
		b)Tumor Biology and Viruses		<ul style="list-style-type: none"> - Acquire knowledge about the basic aspects of tumors, distinguish normal and transformed cells and describe the role of oncogenes and tumor suppressor genes in causing cancers. - Understand the role and mechanism of carcinogens in inducing carcinogenesis and molecular viral mechanisms of transformation and tumorigenesis. - Describe the role of oncogenes, tumor suppressor genes, viral

				<p>oncogenes, types, and mechanism of RNA viruses in inducing tumors.</p> <ul style="list-style-type: none"> - List the DNA viruses causing tumors and learn their tissue transformation mechanisms, role of tumor suppressor genes in tumor suppression, immune mechanisms against tumors, immunotherapy, and physical and chemical therapeutic interventions against tumors
25	VR-406	(a) Clinical Virology (OR)	2017	<ul style="list-style-type: none"> - Acquire basic understanding of virus properties, virus replication and learn methods of virus isolation and characterization of viruses using serological and molecular techniques. - Learn to collect, preserve the virus samples, and detect the viruses using biological, serological, and molecular methods, laboratory biosafety and quality control practices. - Understand the principles of epidemiology, disease occurrence patterns, disease surveillance and control strategies, concept, and methods of modern vaccines to viruses. - Learn about the approaches used for prevention and control of clinically important infectious caused by human viruses, unconventional slow viruses, and prions.

		(b) Emerging Infectious Viral Diseases		<ul style="list-style-type: none"> - Understand the evolution, biology, epidemiology, and emergence of infectious virus diseases, biology of emerging infectious diseases, zoonotic infections - Learn about the biology, clinical symptoms, epidemiology, diagnosis, and control of viruses causing AIDS and SARS and host defense mechanisms against infectious virus diseases. - Describe the biology, clinical symptoms, epidemiology, diagnosis, and control of vector borne emerging infectious viral diseases. - Acquire knowledge on impact of social and environmental change on emergence of viruses, vector control and antiviral therapies, vaccines, public health measures and bioterrorism.

37.Zoology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ZOO-101	Invertebrata & Chordata	2017	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respect to their habit and habitat.</p> <p>iii. In depth understanding of Anatomical features of Integumentary, Circulatory, Reproductive, Respiratory, Receptor, Nervous systems among Chordate groups.</p>
2	ZOO-102	Genetics & Evolution	2017	<p>i. Students will appreciate the concept of epigenetics as a key mechanism of regulation of gene expression steering development and cell fate that can ultimately be affected in disease condition</p> <p>ii. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>iii. Gained knowledge on the factors influencing the pattern of Evolution including Mutations, Natural Selection and Genetic</p>

				<p>drift.</p> <p>iv. Understood the concepts of Micro, Macro evolution speciation categories, Protein evolution etc. to fortify the existing knowledge on Evolutionary patterns.</p>
3	ZOO-103P	Practical-I Invertebrata & Chordata and Genetics	2017	<p>i. Understanding the General Characteristics, Principles of classification, general biology of Invertebrate Communities.</p> <p>ii. To understand the various biological functions, the evolutions of life from most primitive to most advanced form with respective to their habit and habitat.</p> <p>iii. Understanding the comparative aspects of different organs systems among chordate Phyla.</p> <p>iv. The students may apply this knowledge in taxonomy related research and job opportunities.</p> <p>v. Explain the ideas about Mendelian, non-Mendelian inheritance, genetic disorder, gene mutations and sex determination.</p> <p>vi. To understand PTC, Colorblindness test, how to solve genetic problems, pedigree analysis.</p>
4	ZOO-104P	Practical-II Metabolic Regulation & Cell Function and Evolution	2017	<p>i. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p>

				<p>ii. The student will learn and understand about the Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.</p> <p>iii. Students would be trained in various tools and techniques used to gain insight into biological processes.</p> <p>iv. Understood that the four propositions underlying Darwin's theory of evolution through natural selection are:</p> <p>(1) more individuals are produced than can survive;</p> <p>(2) There is therefore, a struggle for existence</p> <p>(3) Individuals within a species show variation</p> <p>(4) Offspring tend to inherit their parental characters.</p>
5	ZOO-105	Metabolic Regulation & Cell Function	2017	<p>i. The students will learn about chemical bonding patterns, chemical structures and classification of carbohydrates and their structural and metabolic role in cellular system i.e. different pathways associated with carbohydrate metabolism.</p> <p>ii. Students would gain expertise to develop understanding of biological processes at chemical; biochemical and molecular level to perform wide range of analytical techniques to explore biological activities.</p> <p>iii. The student will learn and understand about the</p>

				Biosynthesis of Purines and Pyrimidine Nucleotides, degradation of Nucleotides, salvage pathways, biosynthesis and biodegradation of Amino acids, inborn errors of metabolism.
6.	ZOO-106	Human Values and Professional Ethics-I	2017	<p>i. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life.</p> <p>ii. Introduction of several Nature of values to be performed by Humans to lead a good and Peaceful life by extending and imparting good behavior, character and conduct towards people of the society.</p> <p>iii. Introducing different concepts of Bhagavad Gita and its applications in uplifting of Religious values in the present society.</p>
7.	ZOO-201	Cell Biology & Immunology	2017	<p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p> <p>ii. Students would gain expertise in the ultra-structural information of animal cell besides the detailed views of the cell</p>

				<p>interior revealing the various events and actions of cell at the molecular level.</p> <p>iii. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.</p> <p>iv. The student will learn and understand the rationale behind various assays used in immune diagnosis of diseases and will be able to transfer knowledge of immunology in clinical perspective.</p> <p>v. The course will aid in understanding the principles of Graft rejection, Auto immunity and Antibody based therapy.</p>
8.	ZOO-202	Molecular Biology	2017	<p>i. The study of Molecular Biology stands as a tribute to human curiosity for seeking to discover, and to human creative intelligence for devising the complex instruments and elaborate techniques by which these discoveries can be made.</p> <p>ii. Students world gain expertise in understanding the complex molecular mechanisms occurring in cell and the applications of molecular technologies for betterment of life.</p> <p>iii. Understand and our apply the Principles and techniques of Molecular Biology which prepares students for further education employment in teaching, basic research or the health Professions.</p>

9.	ZOO-203P	Practical-I Molecular Biology and Cell Biology	2017	<p>i. Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern and western blotting, recombinant DNA technology etc. they will also know the various tools and techniques related to bacterial microbiology.</p> <p>i. Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signaling and cancers. They will know how to measure and stain different cell types.</p>
10.	ZOO-204P	Practical-II Comparative Animal Physiology and Immunology	2017	<p>i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates.</p> <p>ii. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fullest.</p> <p>iii. Learn the fundamental principles of immune response</p>

				including molecular, biochemical and cellular basis of immune homeostasis. iv. The course will aid in understanding various aspects of immunological response and how it's triggered and regulated.
11	ZOO-205	Comparative Animal Physiology	2017	i. The students will be able to explore an original query in Animal Physiology. The students will appreciate evolutionary changes and environmental adaptations in different taxa of Invertebrates and Vertebrates. ii. An appropriate understanding of functioning of each system of different groups of animals with their comparison will be acquainted. iii. Understanding of the basic concepts of Physiological regulation, from cellular to organ to organismal. iv. Understanding of how different groups of animals have different Physiological adaptations appropriate to carry out the required function to the fillet.
12	ZOO-206	Human Values and Professional Ethics-II	2017	i. Student will know the values of ethics in various fields including medical, social and business ethics. ii. The student will be enriched with several aspects pertaining to Human values and performing of Professional Ethics in day today life. iii. Introduction of several Natural values to be performed by

				Humans to lead a good and Peaceful life.
13	ZOO-301	Developmental Biology	2017	<p>i. Students would gain expertise in explaining how a variety of interacting processes generate an organism's heterogeneous shapes, size and structural features that arise on the trajectory from embryo to adult or more generally throughout a life cycle.</p> <p>ii. Gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.</p> <p>iii. After learning the development of life from cell to multicellularity complex and coordinated systems in organisms the students can apply this knowledge for research, and education, to solve the problems related to development in animals through research.</p>
14	ZOO-302	Environmental Biology	2017	<p>i. Students will be able to apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.</p> <p>ii. Students will be able to use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.</p> <p>iii. Students will be able to be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.</p>

				iv. Students will be able to use technology, such as geographical information systems and computer programming, to assist in problem solving.
15	ZOO-303P	Developmental Biology and Tools & Techniques	2017	<p>i. Developmental Biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development.</p> <p>ii. To understand the fundamental processes that underpins the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.</p> <p>iii. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>iv. Students would gain basic knowledge of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study and understanding of life processes.</p>
16	ZOO-304P	Environmental Biology and Enzymology	2017	i. The student will get idea about the ecological process in its surrounding and at National and Global level and the use of student knowledge on Ecology, Behaviour can be applied to

				<p>Education, Research and Extension programmes in his further career.</p> <p>ii. Students will be understanding the various features and aspects of population ecology, community ecology and ecosystem ecology. They might have the knowledge about environmental biology in details. They will acquire knowledge about various tools and techniques of field ecology.</p> <p>iii. Students learn about enzymes. Their classification and nomenclature</p> <p>iv. Students learn about specificity of enzymes</p> <p>v. Students learn about measurement of enzymatic activity</p> <p>vi. Students learn about isolation, purification of enzymes and intercellular distribution enzymes.</p>
17	ZOO-305A	Tools & Techniques	2017	<p>i. Students would be expertise techniques used for imaging, isolation, purification and characterization of various biological substances.</p> <p>ii. Identify and describe the different equipment and tools used in a biology laboratory.</p> <p>iii. Correctly operate different laboratory instruments.</p> <p>iv. Correctly operate different types of microscopes.</p> <p>v. Prepare tissue for section cutting and correctly operate a microtome.</p>

18	ZOO-305B	Enzymology		<ul style="list-style-type: none"> i. Students gain knowledge about regulation of enzyme activity with respective mechanisms ii. To understand about mechanism of enzymes in clinical diagnosis and their applications iii. Students gain knowledge about immobilization of enzymes, applications of immobilized enzymes.
19	ZOO-305C	Bioinformatics & Biostatistics	2017	<ul style="list-style-type: none"> i. Familiar with various Applications of Bioinformatics by exploring the fundamentals of computer applications in Biology. ii. Describe different methods of data handling using computer. iii. Perform basic operations of gene sequence retrieval and compare them using different software. iv. Perform basic operations of protein structure retrieval and comparison using different software. v. The student will learn about the Computer basics like Operating systems, Programming, Data Access, Internet and Nucleic acid Sequence and Protein Data Banks. vi. The student will learn the basics of handling of data, measures of Central tendency like Mean, Median and Mode, Measures of dispersion like Mean deviation and Standard deviation and Co-efficient of Variation. v. The course will aid in learning Test of significance like Null

				hypothesis and Alternative hypothesis, t-test, F-test, Chi-square test, Correlation and Regression analysis.
20	ZOO-306A	Economic Zoology	2017	<ul style="list-style-type: none"> i. Creating the self-employment opportunities to rural students through Animal husbandry, Aquaculture, Vermiculture and Sericulture. ii. To understand the significance of Economically important animals including cultivable Fishes, Prawns and their culture practices. iii. Identification of Animal pathogenic diseases in Fisheries, Sericulture, Apiculture, Aquaculture and their management strategies.
21	ZOO-306B	Environmental Impact Assessment & Green Auditing	2017	<ul style="list-style-type: none"> i. Be able to access and analyse different case studies/examples of EIA in practice for evaluation/assessment ii. Explain the importance of environmental audits and other management tools in business for social benefit by improving environmental performance iii. Calculate the carbon footprint of any organization and identify suitable mitigation strategies for carbon reduction solutions.
22	ZOO-306C	Biodiversity and conservation	2017	<ul style="list-style-type: none"> i. Student will gain knowledge about the diversity distribution pattern of the enormous number of species and different kinds of ecosystems in the natural world.

				<ul style="list-style-type: none"> ii. The interaction between the various species and environment and the impact of social development on biodiversity iii. The importance of conservation of biodiversity which serving to the mankind and the ecosystem, and the major threats to biodiversity due to human developmental activities. The loss of biodiversity and the impact to the humankind.
23	ZOO-401	Neurobiology		<ul style="list-style-type: none"> i. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials ii. Students learnt and gain knowledge on structure and function of different types of Synapses iii. Gained information on different types of Neurotransmitters i.e. Amino acids and Peptides.
24	ZOO-402	Toxicology	2017	<ul style="list-style-type: none"> i. The awareness about toxic agents, their effects and knowledge about mode of transformation of toxicants will help in creating skilled personnel in the field of environment protection and research. ii. Understanding of the physiological and genotoxic effects of drugs and environmental toxins. iii. To understand various types of insecticides and understand their mode of action to kill/control the insects. Also, the students will learn about novel categories of insecticides that may be compatible with other control strategies.

				iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.
25	ZOO-403P	Neurobiology and Animal Biotechnology & Microbiology	2017	<p>i. Learnt about structure, function and organization of Neurons in the Central nervous system</p> <p>ii. Understanding Electrophysiological techniques and Molecular mechanisms associated with action potentials.</p> <p>iii. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and apply to study microbial phylogeny.</p> <p>iv. Apply the scientific method by stating a question; researching the topic; determining appropriate tests; performing tests; collecting, analyzing, and presenting data and effectively communicate with both specialist and non-specialist audiences/community.</p>
26	ZOO-404P	Toxicology and Animal Behavior & Wild life	2017	<p>i. Skill development in environmental and occupational Toxicology.</p> <p>ii. It provides opportunities for student's research projects, internships in assessing the effects of toxic pollutants on the environment and in the food chain.</p> <p>iii. Identification of different routes of exposure of</p>

				<p>environmental toxins.</p> <p>iv. The students will learn handling of the pesticides in crop protection and understand the therapy and antidotes at the time of poisoning.</p> <p>v. To understand the overview of Animal Behavior and prominence of social organization in insects and primates.</p> <p>vi. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>vii. To understand how to conserve the wild animals</p>
27	ZOO-405A	Animal Biotechnology & Microbiology	2017	<p>i. Understanding of in vitro culturing of organisms and production of transgenic animals.</p> <p>ii. Understanding of cloning of mammals, large scale culture and production from recombinant microorganisms and cloning vectors.</p> <p>iii. This insight allows students to take into consideration about ethical issues involved in production of transgenic animals and BT products.</p> <p>iv. Use in gene transfer technology, genetic manipulations and in a variety of Industrial processes and prominence of IVF, Artificial insemination and embryo transfer techniques.</p> <p>v. Identify microbiological techniques, the defining characteristics of the major groups of microorganisms and</p>

				<p>apply to study microbial phylogeny</p> <p>vi. Classify the nutritional types of microorganisms and measure microbial growth</p> <p>vii. Evaluate how microorganisms interact with the environment in beneficial or detrimental ways</p> <p>viii. Assess impact of plant- microbe interaction on agriculture in both beneficial and detrimental ways. Identify industrially important microbes.</p>
28	ZOO-405B	Animal Behavior & Wild life	2017	<p>i. Understand the overview of Animal Behavior and prominence of social organization in insects and primates</p> <p>ii. Gained lot of information on different types of Learning phenomenon and their mechanisms.</p> <p>iii. To understand the how to conserve wild animals and management strategies.</p> <p>iv. To gain the knowledge about wild animals and animal products importance.</p>
29	ZOO-405C	Endocrinology	2017	<p>i. Understand the pathways associated with Biosynthesis and secretion of Endocrine hormones and their role in the control of metabolism.</p> <p>ii. Through understanding of several endocrines including Peptide hormones, Steroid hormones, Pituitary hormones, Sex hormones, Thyroid hormones etc. in the control of metabolic</p>

				<p>pathways.</p> <p>iii. Understanding the influence of hormones on Growth, Development and Reproduction and their regulatory pattern.</p>
30	ZOO-406A	Genetic Engineering	2017	<p>i. This course exposes students to the applications of genetic engineering in biological research.</p> <p>ii. Students will be able to perform basic genetic engineering experiments at the end of course.</p> <p>iii. Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.</p>
31	ZOO-406B	Structural Biology	2017	<p>i. Understand the evolution of protein structural motifs and domains and associate this with function;</p> <p>ii. Use on-line structural databases and tools to predict the properties, structure and function of proteins.</p> <p>iii. Understand and explain enzyme mechanisms in a structural context.</p> <p>iv. Describe mechanisms of protein folding and the roles of natively unstructured proteins in biology.</p> <p>v. Understand how cross-talk between proteins and post-translational protein modifications (e.g. phosphorylation, ubiquitination) facilitate information processing in cells.</p>
32	ZOO-406C	Human Health and Infectious	2017	<p>i. To understand the basic concepts of Infectious diseases and</p>

		diseases		<p>the role of immunity to control infections</p> <p>ii. Provides knowledge on the physiological mechanisms leading to diseased conditions.</p> <p>iii. Students gains knowledge on the pathogenesis and transmission of infectious diseases.</p> <p>iv. This insight allows the students to learn the treatment methods to control the growth and control of microbes.</p>
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Animal Biotechnology

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	ABT- Core-101	Metabolic Regulation & Cell Function (MRCF)	2017	<ul style="list-style-type: none"> • Knowledge on chemicals bonds, thermodynamics principles and metabolisms of Glycolysis, TCA Cycle and their biomedical importance will be gained. • Metabolic discords of urea cycle and importance of proteins structure and functions can be understood.

				<ul style="list-style-type: none"> • Biosynthesis of purine and pyrimidine nucleotide and Clinical disorders of purine and pyrimidine metabolism can be learnt • To become proficient in Biomedical importance of lipids and over view metabolism of carbohydrate, protein and lipids
2	ABT- Core-102	Tools & Techniques (TT)	2017	<ul style="list-style-type: none"> • Skills will be acquired on chromatography, centrifugation, electrophoresis and blotting techniques • To get knowledge on cell and tissue culture, cell types, culture media and overview of stem cell biology • To acquire skill on electrganetic spectrum, type of detectors, electophysiological methods and brain activity recording techniques • Microscopic techniques, different fixation and staining techniques, tissue processing for microtomy, cryotechiques will be learnt
3	ABT-Core-P-103	Metabolic Regulation & Cell Function	2017	<ul style="list-style-type: none"> • Practical knowledge will be gained on biochemical assays like estimation of proteins, structural proteins, soluble proteins, free amino

				<p>acids, total carbohydrates and total cholesterol.</p> <ul style="list-style-type: none"> To gain knowledge in handling equipments like cooling centrifuge, autoclave, laminar air flow etc., and, maintenance of animal cell culture laboratory. <p>To learn microbial media preparation for their culture and identification</p>
4	ABT-Core-P-104	Tools & Techniques	2017	<ul style="list-style-type: none"> Isolation of DNA from chick liver Agarose gel electrophoresis Estimation of DNA and RNA by diphenyl anime method and orcinal method Paper chromatography Plating procedures Gram staining Anti microbial susceptibilities test
5	ABT-CF-105	Microbiology and Diseases	2017	<ul style="list-style-type: none"> Microorganisms classification and structure of prokaryotic and eukaryotic microorganism can be understood To get knowledge on Nutritional requirements to microorganisms, growth of microorganism, control of microorganism and microbes of biotechnological importance

				<ul style="list-style-type: none"> • To become proficient in chemical nature of gene, plasmids incompatibility, horizontal transfer of genome among the microbial community and Benzer's classical studied on II locus • To learn diseases caused by microorganism
6	ABT -EF-106	Human Values & Professional Ethics (HVPE)-I	2017	<ul style="list-style-type: none"> • Knowledge will be gained on nature of ethics its relation to religion. Politics, Business • To understand nature of values Good and Bad, end and means, analysis of basic moral concepts, good behavior and respect for elders, character and conduct • Proficient on hagavad Githa • Crime and theories of punishment will be learnt
7	ABT- Core-201	Molecular Biology (MB)	2017	<ul style="list-style-type: none"> • To gain knowledge on DNA structure, genome of Nuclear and mitochondrial and maternal Inheritance • To understand replication in prokaryotes, Enzymology of DNA replication, Discontinuous replication and Bidirectional replication • Synthesis of RNA, Types of RNA, Genetic code and Ribosome structure will be understood

				Knowledge will be gained regulation I and II and Operon concepts
8	ABT- Core-202	Animal Cell culture & Stem Cell Biology (ACC-SCB)	2017	<ul style="list-style-type: none"> • To understand animal cell culture, biology of stemcells and embryonic stem cell • To learn propagation of embryonic stem cells, nuclear transfer technology, animal cloning and stem cell differentiation • To gain knowledge on stem cell plasticity, stem cell assay and protocols, stem cell separations and stem cell therapies <p>To learn stem cells and tissue engineering, human embryonic stem cells and society, intellectual property results</p>
9	ABT-Core-P-203	Molecular Biology & Immunology	2017	<ul style="list-style-type: none"> • Effect of UV radiation on bacterial growth • SDS PAGE • Electrophoresis • Blood grouping • Blood smear preparation • RBC count • Radial Immuno Diffusion • Neubauer chamber
10	ABT-Core-	Animal Cell culture & Stem Cell	2017	<ul style="list-style-type: none"> • Laboratory safety rules and regulations

	P-204	Biology & Cell Biology		<ul style="list-style-type: none"> • Animal handling and care • Preparation of cell culture media • Staining of animal cells • Preparation of cell lines • Culture of virus in chick embryo
11	ABT- CF- 205	Cell Biology & Immunology (CB&IM)	2017	<ul style="list-style-type: none"> • Able to learn organization of prokaryotic and eukaryotic cell, Nucleus structure, Eukaryotic chromosome and polytene and lamp brush chromosomes • To learn mechanism of cell division, regulation of eukaryotic cellcycle, chromosomal abnormalities and tumor biology • To understand types of immunity, types of cell involved in immune response, structure and function of antibody and complimentarily cascade • To gain knowledge on Antigen presentation, hypersensitivity reactions, immune tolerance and immunopathology
12	ABT- EF- 206	Human Values & Professional Ethics (HVPE)-II	2017	<ul style="list-style-type: none"> • To gain knowledge on value education • To learn medical ethics • To become proficient on business ethics • To understand environmental ethics and

				social ethics
13	ABT- Core-301	Enzymology (ENZ)	2017	<ul style="list-style-type: none"> • To understand enzyme specificity, enzyme catalysis and isolation and purification of enzymes • To gain knowledge on theories of enzymes kinetics, enzyme kinetics and its importance, effect of reactant concentrations and effect of temperature of pH and enzyme concentration reaction rate • To become proficient on clinical aspects of enzymology, immobilized enzymes, isoenzymes and enzyme engineering
14	ABT- Core-302	Animal Reproduction, Breeding & Transgenic Technology (ARBTT)	2017	<ul style="list-style-type: none"> • To become proficient on structure and function of male and female reproductive system; reproductive cycles and contraception in male and females • To gain skill on sex determination, selection for qualitative inherited characters, parental determination and verification and progeny testing • To understand artificial insemination techniques, in vitro fertilization, embryo transfer technology, microinjection and macroinjection • To learn transgenic technology

				development, generation of chimeric, transgenic and knockout mice
15	ABT-Core-P-303	Enzymology & Genetic Engineering	2017	<ul style="list-style-type: none"> • To determine the effect of substrate concentration, enzyme concentration and temperature on enzyme activity • Measures of central tendency • regression and correlation analysis • T-test
16	ABT-Core-P-304	Animal Reproduction, Breeding & Transgenic Technology & Environmental Biotechnology	2017	<ul style="list-style-type: none"> • To estimate the sperm motility, sperm count , sperm membrane integrity test and pH of semen. • Determination sperm viability • Retrieval of gene and protein sequence from gene and protein bank, redelivery
17	GE-305A	Genetic Engineering (GE)	2017	<ul style="list-style-type: none"> • Use of enzymes in DNA and RNA synthesis, restriction enzymes and ligation and modification o DNA • To learn vectors for constructions of genomic libraries, expression vectors, promoters and vectors used for cloning • To gain knowledge on DNA fragments,

				<p>cDNA synthesis, PCR</p> <ul style="list-style-type: none"> To become proficient on ligation between cohesive and blunt end DNA fragments, introduction of cloned genes into host and expression of cloned genes
18	GE-305B	Environmental Biotechnology (EBT)	2017	<ul style="list-style-type: none"> To gain knowledge on waste and pollutants, hazards from wastes and pollutants and hazards from chemicals in wastes Waste treatment, treatment of liquid wastes, treatment of solid waste and contributions of biotechnology to waste treatment will be understood To become proficient in aerobic waste water treatment and measurement of pollution levels To learn anaerobic treatment of waste water, biodegradation of xenobiotics compounds, hazards from xenobiotics and bioremediation
19	GE-305C	Biostatistics & Bioinformatics	2017	<ul style="list-style-type: none"> To understand prediction of protein structure and protein sequence database, prediction of gene structure, submission of sequence to database, phylogenetic analysis

				<ul style="list-style-type: none"> • To learn biostatistics, measures of location and dispersion, curve fitting and correlation and regression • To understand probability distribution, tests of significance, student t-test and F-test, chi square test and their application
20	OE-306A	Animal Biotechnology & Industrial Applications	2017	<ul style="list-style-type: none"> • To gain knowledge on preservation animals engineered bacteria/yeast/ cell lines, metabolic engineering, fermentative production and glycolytic pathway • To understand monoclonal antibodies production and genetically engineered products • To know the DBT guidelines, Global scenario of transgenic micro organisms and ethical issues related to biotechnology products
21	OE-306B	Cancer Biology	2017	<ul style="list-style-type: none"> • To gain knowledge on cancer types and tumor development • To learn oncogenes, mechanisms of onogene activation and chromosomal translocation • To understand cell cycle regulation and cancer, DNA Damage and repair

				<ul style="list-style-type: none"> To learn tumor immunology, Vaccine development, tumor cell evasion of immune defenses
22	ABT- Core- 401	Medical Biotechnology (MBT)	2017	<ul style="list-style-type: none"> To understand disease diagnosis, use of monoclonal antibodies in detection of genetic disease To learn Disease treatment, interferons, growth factor, and antisense nucleotide as therapeutic agent To gain knowledge on gene therapy, types of gene therapy, augmentation therapy and targeted transfer To become proficient on forensic medicine, preparation of DNA sample. Approaches for DNA analysis and applications of forensic medicine
23	ABT- Core- 402	Fermentation Technology and Downstreaming Process (FTDSP)	2017	<ul style="list-style-type: none"> To understand cell distribution methods, separation techniques, purification by chromatographic techniques and isolation and screening and maintenance of industrially importance microbes To learn bioreactor design, fermentation economics, upstream processing, membrane based

				<p>separations</p> <p>To gain knowledge on importance of downstream processing economics of downstream processing</p>
24	ABT-Core-P-403& 404	Project and Viva- Voce	2017	<ul style="list-style-type: none"> • Students must perform project work which includes experiments related to Toxicology, Animal Tissue culture, Fermentation technology or any work related to biology. <p>After completion of project work students have to prepare dissertation by their own and submit to the committee members.</p> <ul style="list-style-type: none"> • Evaluation of dissertation will be conducted by committee members through Viva-Voce
25	GE-405A	Biosafety, Bio Ethics & Intellectual Property rights	2017	<ul style="list-style-type: none"> • To understand socio-economic and legal impact of biotechnology, use of genetically modified organisms, moral and ethical issues in biotechnology and safety issues with GMO • To learn intellectual property right, evaluation of patenting, application of GATT and IPR and WTO Act and global and Indian

				<p>biodiversity</p> <ul style="list-style-type: none"> • To gain knowledge on Indian Patent Act 1970, role of country patent office, U.S. Patent trademark office and U.S. Patent system Vs Indian Patent system • To gain knowledge on Ethics and genetic engineering, patent of genes, human cloning, stem cell, regulatory requirements for drugs and biologics, GLP and GMP
26	GE-405B	Drug design and Development	2017	<ul style="list-style-type: none"> • To learn drug design, analog approach of drug designing • To understand SAR Vs QSAR, Partition coefficient, Hammett's substituent constant and Taft's steric constant, Free Wilson mode, 3D-QSAR approach like COMFA and COMIA • To gain knowledge on pharmacological screening and assays, pharmacological screening models for therapeutic areas, cell based assay, biochemical assay, radiological binding assay, small molecule manufacturing • To learn Drug Laws, FDA, OECD, ICH, Schedule Y, drug registration, Regulations of

				human pharmaceuticals and biological products, and clinical trial design
27	GE-405C	Animal Cell Culture Techniques	2017	<ul style="list-style-type: none"> • To understand Animal cell culture, culture medium, characteristics of cell in culture, measurement of viability and cytotoxicity , cell types and apoptosis • To gain knowledge in scaling up of animal cell culture, cell transformation, tissue engineering, transgenic animals, animal cloning • To become proficient in improvement of biomass, pharming products, plasminogen activator and ethical issues related to biotechnology products
28	OE-406A	Advanced Genomics and Proteomics	2017	<ul style="list-style-type: none"> • To learn structure of Prokaryotic and Eukaryotic genomes, Isolation and purification of genomic DNA, Construction of Physical maps and Whole genome sequence alignment • To understand genome annotation, methods for gene identification, functional genomics, transcript profiling

				<ul style="list-style-type: none"> To learn protein structure, sample preparation and separation 2D-analysis, Multidimensional liquid chromatography, protein-protein interactions analysis <p>To gain knowledge on DNA /protein sequence homologies, Gene duplication and</p>
29	OE-406B	Bio resource Technology (Apiculture, Sericulture , Aquaculture, Vermiculture)	2017	<ul style="list-style-type: none"> To understand Types of honey bees, life history of honey bees, management of apiculture and by products of honey bees and economic importance disease and their control To become proficient on fresh water fin fish culture, shell fish (prawn and Pearls) culture To understand historical background of vermicompost, methods of vermiculture and problems involved in vermicompost

SVU College of Commerce Management and Computer Science

38. Business Management

S.No	Course Code	Name of the Course	Year of introduction	Course Outcomes
1	MBA 101	Management And Organisational Behaviour	2017	<p>Examine the Management concepts and functions.</p> <p>Apply the concepts of planning, decision making.</p> <p>Apply the concepts of delegation of authority, decentralisation and departmentation in real life situations.</p> <p>Analyse the controlling principles and practices, Ethics and corporate social responsibility.</p> <p>Evaluate the basic concepts of organizational conflicts and climate.</p>
2	MBA 102	Managerial Communications	2017	<p>Apply the basic concepts of communication for business correspondence.</p> <p>Distinguish different forms of communication.</p> <p>Evaluate different types of communication.</p> <p>Adapt report writing skills of different types on need basis.</p> <p>Acquire presentation skills along with the interview techniques.</p>
3	MBA 103	Managerial Economics	2017	<p>Describe the importance of managerial economics and its contribution to decision making in different types of business organizations by the managerial economist.</p>

				<p>Apply the basic principles of managerial economics.</p> <p>Apply demand analysis concept in the real life business situations.</p> <p>Discuss the meaning and usefulness of the production function and cost function in analysing the firm's production activity.</p>
4	MBA 104	Accounting For Managers	2017	<p>Outline the basic knowledge of accounting, bookkeeping, accounting Principles, accounting cycle.</p> <p>Apply the concepts of journal, ledger and Trail balance.</p> <p>Identify the nature of expenditure and revenue for preparation of financial statements of business.</p> <p>Examine the role of accounting policies like depreciation.</p>
5	MBA 105	Quantitative Analysis For Management Decisions	2017	<p>Recall the fundamentals in Mathematics and Statistics.</p> <p>Demonstrate the methods to solve derivatives, progressions and gaming.</p> <p>Choose decision making in a competitive situation.</p> <p>Solve transportation Problem with minimum cost of transport of commodities.</p>
6	MBA 106	Information Technology For Managerial Applications	2017	<p>Identify various network topologies.</p> <p>Apply Various Mathematical & Statistical Operations Using MS office &MS-Excel.</p> <p>Create Effective basic power point Presentations</p>
7	MBA 107	Business Statistics	2017	<p>About the information needs, sources of data and measures of central</p>

				<p>tendency .</p> <p>The concept of Scientific Research and the methods of conducting Scientific Enquiry.</p> <p>The Statistical Tools of Data Analysis.</p>
8	MBA 108	Human Values And Professional Ethics	2017	<p>About ethics, values and morals.</p> <p>The concepts of value based education and its relevance.</p> <p>Learn about environmental and social ethics</p>
9	MBA 201	Marketing Management	2017	<p>Outline the concepts of marketing.</p> <p>Create the segmentation, targeting and positioning in marketing.</p> <p>Analyse various phases of product life cycle.</p> <p>Evaluate various methods of pricing and identify the best pricing strategy.</p> <p>Evaluate marketing communication strategies.</p>
10	MBA 202	Financial Management	2017	<p>Outline the basic concepts of Financial Management.</p> <p>Comprehend the various methods of Investment Analysis and apply various techniques of capital budgeting.</p> <p>Adapt the concepts of leverage, capital structure and its effect on the long term survival of the firm.</p> <p>Appraise various methods of computation of cost of capital.</p>
11	MBA 203	Human Resources Management	2017	<p>Outline the functions and challenges of HRM.</p> <p>Apply different concepts of HR Planning, Recruitment, Selection, Training, Interviewing Techniques and Executive Development</p>

				<p>Programs.</p> <p>:Apply the uses of job analysis, job description, job specification, ergonomics in industry and the methods of job evaluation.</p> <p>Utilize the various methods of performance appraisal.</p>
12	MBA 204	Production Management	2017	<p>Apply the basic concepts of production and operations management and identify types of manufacturing processes.</p> <p>Define and explain concept of production planning and control.</p> <p>Identify effective plant location and plant layout.</p> <p>Design strategies to improve productivity.</p>
13	MBA 205	Business Research Methods	2017	<p>Adapt the fundamentals of Business research methodology.</p> <p>Identify research problem.</p> <p>Apply sample and census survey and measuring techniques.</p> <p>Design data collection techniques.</p> <p>Develop data processing procedures and apply tools.</p> <p>Draft thesis/report writing.</p>
14	MBA 206	Management Information Systems	2017	<p>Understand various types of information systems.</p> <p>Analyse the various functional information systems</p>
15	MBA 207	Operation Research	2017	<p>Understand various concepts and techniques of OR.</p> <p>Apply various OR techniques to improve the efficiency of the organisations.</p>
16	MBA 208	Leadership Values	2017	<p>Identify the leadership qualities to run an organization successfully.</p> <p>Appraise the various concepts of value based leadership.</p>

17	MBA 301	Business Environment	2017	<p>Outline the basic concepts of business environment and its components.</p> <p>Analyze the structure of Indian economy.</p> <p>Discuss the components of fiscal policy and balance of payments.</p> <p>Evaluate different trade related policies.</p>
19	MBA 302	Entrepreneurship	2017	<p>Understand the concept of entrepreneurship.</p> <p>Analyse entrepreneurship development programs in India and contents for training for entrepreneurial competencies.</p> <p>Develop Creativity in entrepreneurship.</p> <p>Design the project reports & make project evaluation</p>
20	MBA 311	Consumer Behaviour	2017	<p>Evaluate the consumer behaviour and business strategies.</p> <p>Apply the various consumer behaviour models.</p> <p>Build the psychological process and develop the effective strategy in terms of impact on consumer behaviour.</p>
21	MBA 312	Customer Relationship Management	2017	<p>Develop the concepts of CRM and strategies in business.</p> <p>Appraise the customer profile and perception of customer behavior in relationship perspectives.</p> <p>Analyse strategies for customer acquisition, models of CRM.</p>
22	MBA 313	Marketing Research And Information Systems	2017	<p>Understand basic concepts of research and methodology of conducting researches in marketing domain.</p>

				<ul style="list-style-type: none"> Pursue the summer training/ project work and a winter project work and a professional career in Marketing Research domain.
23	MBA 314	Advertising And Sales Promotion Management	2017	<p>Discuss the basic concepts of advertising for better understanding the challenges and opportunities in advertising .</p> <p>Analyse the relations of advertising with segmentation and budget decision .</p> <p>Design better advertising strategies for the company .</p> <p>Identify media options which are suitable for the company for better promotion .</p> <p>Develop an effective advertising campaign for the company .</p>
24	MBA 315	Product And Brand Management	2017	<p>Discuss the importance of brand image in marketing .</p> <p>Formulate brand vision which communicates better the organisations' policy on Branding .</p> <p>Analyse brand promotion methods in brand communication .</p> <p>Analyse factors influencing brand extension decisions .</p> <p>Design brand marketing programmes and for better brand performance .</p>
25	MBA 316	Digital Marketing	2017	<p>Get knowledge regarding basic concepts of Digital Marketing.</p> <p>Analyse and Choose different channels of digital marketing according to the changing requirements of the markets</p> <p>Construct different digital marketing plans on situational basis.</p>

				Manage digital by conducting a marketing research and adapt the changes by creating new goals for further reputation.
26	MBA 321	Financial Services	2017	Have awareness on insurance industry & its regulations. Create awareness on different financial services.
27	MBA 322	Investment Management	2017	Analyse various investment alternatives for effective investment decision . Discuss the importance of security analysis in investment decision process . Design bond management strategies to realise good return on bond investment . Apply different equity valuation methods for the valuation of securities . Construct optimal portfolio for higher return at lower risk . Analyse different schemes of mutual funds for better investment decision .
28	MBA 323	Business Taxation	2017	Conclude the fundamentals of Taxation . Discuss taxation methods of companies and individuals . Analyse income sources from business through taxation . Evaluate Tax management strategies
29	MBA 402	Strategic Management	2017	Develop vision, mission and objectives of the organization. Analyse industry and develop techniques of competitive analysis. Appraise strategic leadership styles and actions.

				<p>Formulate effective strategies in business.</p> <p>Develop a frame work for the implementation strategies in business.</p> <p>Evaluate the strategy controls by measuring performance of organization.</p>
30	MBA 403	Business Laws And Ethics	2017	<p>Analyze the Indian Contract Act.</p> <p>Evaluate Sales of Goods Act and the machinery for redressal of consumer grievances.</p> <p>Elaborate rights and duties of agent and principal, Principal's liability for the acts of agent and the procedure for termination of agency.</p> <p>Examine the rights and duties of partners, dissolution of partnership firm.</p>

39.Computer Science

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MCA 101	Discrete Mathematical Structures	2017	<ol style="list-style-type: none"> 1. The students become familiar with the Sampling Distributions like with replacement and without replacement 2. The problems in OR, Computer science,

				<p>Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it.</p> <p>3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution</p>
2	MCA 102	Object Oriented Programming with Java	2017	<p>1. Solve and Implement solution for the problem using java basic elements like variables, control structures.</p> <p>2. Handle Object Oriented Concepts effectively in the real time problems.</p> <p>3. Understand the architecture and working procedure of platform independent language JAVA SDK.</p>
3	MCA 103	Computer Organization	2017	<p>1. To gain knowledge about the Micro Processors.</p> <p>2. To study the hierarchical memory system including cache memories and virtual memory.</p>
4	MCA 104	Operating Systems	2017	<p>1. Learn evaluation of different types</p>

				<p>Operating System and their functionalities.</p> <p>2. Learn Internal structure and the function procedure of Operating system in detail.</p>
5	MCA 105	<p>105A.Accounting and Financial management</p> <p>105B.Accounting Essentials for Computer Applications</p>	2017	<p>1. Use of Accounting information to managers with in the organization.</p> <p>2. Informs the business decision & control the Management Functions.</p>
6.	MCA 106 P	<p>Software Lab I (based on 101 & 103)</p>	2017	<p>1. The students become familiar with the Sampling Distributions like with replacement and without replacement</p> <p>2. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it.</p> <p>3. Student uses a variety of strategies to investigate mathematical models of situations involving Binomial, Poisson's and Normal distribution.</p> <p>4. To gain knowledge about the Micro Processors.</p>

				5. To study the hierarchical memory system including cache memories and virtual memory
7.	MCA 107 P	Object Oriented Programming Lab	2017	<ol style="list-style-type: none"> 1. Solve and Implement solution for the problem using java basic elements like variables, control structures. 2. Handle Object Oriented Concepts effectively in the real time problems. 3. Understand the architecture and working procedure of platform independent language JAVA SDK.
8.	MCA 108P	Operating Systems Lab	2017	<ol style="list-style-type: none"> 1. Learn evaluation of different types Operating System and their functionalities. 2. Learn Internal structure and the function procedure of Operating system in detail.
9.	MCA 201	Computer Oriented Operations Research	2017	<ol style="list-style-type: none"> 1. solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities. 2. formulate and solve problems as networks and graphs and set up decision

				<p>models and use some solution methods for nonlinear optimization problems.</p> <ol style="list-style-type: none"> analyse the general nonlinear programming problems. formulate the nonlinear programming models.
10.	MCA 202	Data Structures using Java	2017	<ol style="list-style-type: none"> Develop a program a structured Programming Using JAVA. Develop a Memory Handling work & Sequential Data file handling. Maintain data using proper data organizing structures.
11	MCA 203	Data Communication and Computer Networks	2017	<ol style="list-style-type: none"> Understand the Network Terminologies and the components used to build networks. Understand Network Models (Topologies) to establish networked systems. Understand the internal architecture, working procedure of OSI Layer and Protocols.
12	MCA 204	Advanced Database Management	2017	<ol style="list-style-type: none"> Students will get an attempt to provide

		Systems		<p>with the advanced information about ADBMS and their development.</p> <ol style="list-style-type: none"> 2. This Subject also provides the conceptual background necessary to design and develop distributed database System for real life applications and also helps to learn Query optimization, centralized query optimization, Distributed query optimization algorithms. 3. How SQL Programs are implemented as a series of primitive operations and how DDBs are implemented and how applications are design for those DDB
13	MCA 205	205A. E-Commerce	2017	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems. 3. Understand the processes of developing and implementing information systems and be aware of the ethical, social, and security issues of information systems;

14		205B. Cyber Security	2017	<ol style="list-style-type: none"> 1. Analyze and evaluate the cyber security needs of an organization and determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation. 2. Measure the performance and troubleshoot cyber security systems and implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools. 3. Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators, Design and develop a security architecture for an organization and design operational and strategic cyber security strategies and policies.
15		205C. Neural Networks	2017	<ol style="list-style-type: none"> 1. Define what is Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network.

				<ol style="list-style-type: none"> 2. Analyze ANN learning, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning and Boltzmann learning. 3. Implement Simple perception, Perception learning algorithm, Modified Perception learning algorithm, and Adaptive linear combiner, Continuous perception, learning in continuous perception.
16	MCA 301	Software Engineering	2017	<ol style="list-style-type: none"> 1. Develop a system in a systematic way by using various Prescriptive Process models like Waterfall and SDLC. 2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements. 3. Analyze and translate a specification into

				<p>a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse</p>
17	MCA 302	Computer Graphics	2017	<ol style="list-style-type: none"> 1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics. 2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis and Use of geometric transformations on graphics objects and their application in composite form. 3. Extract scene with different clipping methods and its transformation to graphics display device, Explore projections and visible surface detection techniques for display of 3D scene on 2D screen and Render projected objects to naturalize the scene in 2D view and use of illumination models for this.

18	MCA 303	Web Technologies	2017	<ol style="list-style-type: none"> 1. Explain the history of the internet and related internet concepts that are vital in understanding web development. 2. Discuss the insights of internet programming and implement complete application over the web and students can Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet. 3. Utilize the concepts of JavaScript and Java, Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.
19	MCA 304	304A.Data warehousing and Data mining	2017	<ol style="list-style-type: none"> 1. To identify the scope and essentiality of Data Warehousing and Mining and to analyze data, choose relevant models and algorithms for respective applications. 2. To study spatial and web data mining. 3. Students develop research interest towards

				advances in data mining.
20		304B.Big Data Analytics	2017	<ol style="list-style-type: none"> 1. Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. 2. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. 3. Students Interpret business models and scientific computing paradigms, and apply software tools for big data analytics and achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications
21		304C System Programming	2017	<ol style="list-style-type: none"> 1. Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems). 2. Ability to use theoretical and applied information in these areas to design

				<p>system software with realistic constraints.</p> <p>3. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language programming and Unix shell programming.</p>
22	MCA 305	305A. Cryptography and Network Security	2017	<p>1. Provide security of the data over the network and do research in the emerging areas of cryptography and network security.</p> <p>2. Implement various networking protocols.</p> <p>3. Protect any network from the threats in the world</p>
23		305B. Artificial Intelligence	2017	<p>1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations and Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.</p> <p>2. Demonstrate awareness and a fundamental understanding of various</p>

				<p>applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.</p> <p>3. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool, Demonstrate proficiency in applying scientific method to models of machine learning and Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.</p>
24		305C.Mobile Application Development	2017	<ol style="list-style-type: none"> 1. Identify various concepts of mobile programming that make it unique from programming for other platforms, Critique mobile applications on their design pros and cons. 2. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, 3. Program mobile applications for the Android operating system that use basic

				and advanced phone features, and deploy applications to the Android marketplace for distribution.
25	MCA 401	401A.Cloud Computing	2017	<ol style="list-style-type: none"> 1. Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. 2. Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient. 3. Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model. 4. Illustrate the fundamental concepts of cloud storage and demonstrate their use

				in storage systems such as Amazon S3 and HDFS.
26		401B. Dot Net Technologies	2017	<ol style="list-style-type: none"> 1. To explore .NET technologies for designing and developing dynamic, interactive and responsive web applications. 2. Provide a consistent, object-oriented programming environment whether object code is stored and executed locally, executed locally but webdistributed, or executed remotely. 3. Make the developer experience consistent across widely varying types of apps, such as Windowsbased apps and Web-based apps.
27		401C. Software Testing	2017	<ol style="list-style-type: none"> 1. List a range of different software testing techniques and strategies and be able to apply specific(automated) unit testing method to the projects. 2. Distinguish characteristics of structural testing methods and demonstrate the integration testing which aims to uncover

				<p>interaction and compatibility problems as early as possible.</p> <p>3. Discuss about the functional and system testing methods and demonstrate various issues for object oriented testing.</p>
28	MCA 402	402A. Essentials of Data Science	2017	<p>1. Having a clear understanding of the subject related concepts and contemporary issues.</p> <p>2. Having problem-solving ability- to assess social issues and engineering problems.</p> <p>3. Having a clear understanding of professional and ethical responsibility.</p> <p>4. Having cross-cultural competency exhibited by working as a member or in teams. And having a good working knowledge of communicating in English – communication with the engineering community and society</p>
29		402B.Deep Learning	2017	<p>1. Understand the role of deep learning in machine learning applications and get familiar with the use of TensorFlow/Keras in deep learning</p>

				<p>applications.</p> <ol style="list-style-type: none"> 2. Compare Various deep learning Algorithms used for Classification Segmentation and detection. 3. Apply various concepts related with Deep Learning to solve Problems. Analyse different deep learning models in Image related projects.
30		402C.Internet of Things	2017	<ol style="list-style-type: none"> 1. Able to understand the application areas of IOT. 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. 3. Able to understand building blocks of Internet of Things and characteristics.
31	MCA 403	Major Project Work	2017	

M.Sc (CS) : Master of Computer Science

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
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1	MSCS -101C	Computer Organization	2017	<ol style="list-style-type: none"> 1. To gain knowledge about the Micro Processors. 2. To study the hierarchical memory system including cache memories and virtual memory.
2	MSCS -102C	Programming in Java & Data Structures	2017	<ol style="list-style-type: none"> 1. Develop a program a structured Programming Using JAVA. 2. Develop a Memory Handling work & Sequential Data file handling. 3. Maintain data using proper data organizing structures.
3	MSCS -103C	Operating Systems	2017	<ol style="list-style-type: none"> 1. Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,. 2. Analyze important algorithms eg. Process scheduling and memory management algorithms. 3. Categorize the operating system's resource management techniques, dead lock management techniques, memory

				<p>management techniques.</p> <p>4. Demonstrate the ability to perform OS tasks in Red Hat Linux Enterprise.</p>
4	MSCS – 104 GE – A	Mathematical Foundations For Computer Science	2017	<ol style="list-style-type: none"> 1. Ability to apply mathematical logic to solve problems. 2. Understand sets, relations, functions, and discrete structures. 3. Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions. 4. Able to formulate problems and solve recurrence relations. 5. Able to model and solve real-world problems using graphs and trees.
5	MSCS – 104 GE - B	ComputerOriented Operational Research	2017	<ol style="list-style-type: none"> 1. Solve the problems using special solution algorithms and use CPM and PERT techniques, to plan, schedule, and control project activities. 2. Formulate and solve problems as networks and graphs and set up decision models and use some solution methods

				<p>for nonlinear optimization problems.</p> <ol style="list-style-type: none"> 3. Analyse the general nonlinear programming problems. 4. Formulate the nonlinear programming models.
6	MSCS - 05CF	Environmental Studies	2017	<ol style="list-style-type: none"> 1. Articulate the interconnected and interdisciplinary nature of environmental studies. 2. Demonstrate an integrative approach to environmental issues with a focus on sustainability. 3. Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences, and humanities in environmental problem solving. 4. Communicate complex environmental information to both technical and non-technical audiences. 5. Understand and evaluate the global scale of environmental problems and reflect critically on their roles, responsibilities,

				and identities as citizens, consumers and environmental actors in a complex, interconnected world.
7	MSCS - 106EF	1. A. PC HardwareBasics	2017	<p>2. Identify the hardware components of a computer. Lists the hardware components such as processor, memory, disk, main board, etc.</p> <p>3. Explains the features of the hardware components of a computer. Explains the relationships between the components of a computer and how data are transferred among the components.</p> <p>4. identify the peripheral devices outside computer. Uses computer using input devices, such as keyboard and mouse.</p> <p>5. Transfers data outside the computer using output devices, such as screen and printer. Saves files to removable devices and loads files from removable devices.</p> <p>6. Connects to the Internet using network cards. identify the software's running on a computer. Identifies BIOS and changes</p>

				settings in BIOS.
8	MSCS - 106EF	B. Statistical Methods	2017	<ol style="list-style-type: none"> 1. Calculate and interpret the correlation between two variables. Calculate the simple linear regression equation for a set of data. 2. Employee the principles of linear regression and correlation, including least square method, predicting a particular value of Y for a given value of X and significance of the correlation coefficient. 3. Know the association between the attributes. Know the construction of point and interval estimators. 4. Evaluate the properties of estimators. Demonstrate understanding of the theory of maximum likelihood estimation.
9	MSCS -201C	Advanced Data Base Management System	2017	<ol style="list-style-type: none"> 1. Explain and evaluate the fundamental theories for advanced database architectures and query operators. 2. Design and implement parallel database systems with evaluating different methods of storing, managing of parallel

				<p>database.</p> <ol style="list-style-type: none"> 3. Assess and apply database functions of distributed database. Evaluate different database designs and architecture. 4. Administer and analyze database with query optimization techniques and develop Web interface with database. 5. Understand advanced querying and decision support system.
10	MSCS -202C	Computer Networks	2017	<ol style="list-style-type: none"> 1. Describe the general principles of data communication. Describe how computer networks are organized with the concept of layered approach. 2. Describe how signals are used to transfer data between nodes. Implement a simple LAN with hubs, bridges and switches. 3. Describe how packets in the Internet are delivered. Analyze the contents in a given data link layer packet, based on the layer concept. 4. Design logical sub-address blocks with a given address block. Decide routing

				<p>entries given a simple example of network topology.</p> <p>5. Describe what classless addressing scheme and how routing protocols work.</p>
11	MSCS -203C	Computer Graphics	2017	<ol style="list-style-type: none"> 1. The course introduces the basic concepts of computer graphics. It provides the necessary theoretical background and demonstrates the application of computer science to graphics. The course further allows students to develop programming skills in computer graphics through programming assignments. 2. Understands the core concepts and mathematical foundations of computer graphics knows fundamental computer graphics algorithms and data structures. 3. Has an overview of different modeling approaches and methods and has detailed knowledge about basic shading and texture mapping techniques. 4. Understands light interaction with 3D scenes.

12	MSCS- 204 GE – A	E- Commerce	2017	<ol style="list-style-type: none"> 1. Understand the basic concepts and technologies used in the field of management information systems. 2. Have the knowledge of the different types of management information systems. Understand the processes of developing and implementing information systems. 3. Be aware of the ethical, social, and security issues of information systems;
13	MSCS- 204 GE B	Accounting And Financial Management	2017	<ol style="list-style-type: none"> 1. Use of Accounting information to managers within the organization. 2. Informs the business decision & control the Management Functions.
14	MSCS- 205CF	Human Rights And Value Education	2017	<ol style="list-style-type: none"> 1. understand the historical growth of the idea of human rights. 2. demonstrate an awareness of the international context of human rights. 3. demonstrate an awareness of the position of human rights in the UK prior to 1998. 4. understand the importance of the Human Rights Act 1998, analyse and evaluate concepts and ideas.

15	MSCS- 206 EF A	Principles Of Management	2017	<ol style="list-style-type: none"> 1. Understand the concepts related to Business. 2. Demonstrate the roles, skills and functions of management. 3. Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions. 4. Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
16	MSCS- 206 EF B	Internet Of Things	2017	<ol style="list-style-type: none"> 1. Able to understand the application areas of IOT. 2. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. 3. Able to understand building blocks of Internet of Things and characteristics.
17	MSCS-301C	Data Warehousing and Data Mining	2017	<ol style="list-style-type: none"> 1. Understand the functionality of the various data mining and data warehousing component.

				<ol style="list-style-type: none"> 2. Appreciate the strengths and limitations of various data mining and data warehousing models. 3. Explain the analyzing techniques of various data. 4. Describe different methodologies used in data mining and data ware housing. 5. Compare different approaches of data ware housing and data mining with various technologies.
18	MSCS-302C	Web Technologies	2017	<ol style="list-style-type: none"> 1. Analyze a web page and identify its elements and attributes. 2. Create web pages using XHTML and Cascading Style Sheets. 3. Build dynamic web pages using JavaScript (Client side programming). Create XML documents and Schemas. 4. Build interactive web applications using AJAX.
19	MSCS-303C	Software Engineering	2017	<ol style="list-style-type: none"> 1. Develop a system in a systematic way by using various Prescriptive Process models like Waterfall and SDLC.

				<ol style="list-style-type: none"> 2. Develop Systems with low cost and High Performance. And Know about different types of software product types and their process and Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements. 3. Analyze and translate a specification into a design, and then realize that design and students are able to use modern engineering tools necessary for software project management, time management and software reuse
20	MSCS -304-GE-A	Systems Programming	2017	<ol style="list-style-type: none"> 1. Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, text editors, debuggers, interpreters, compilers, operating systems). 2. Ability to use theoretical and applied information in these areas to design

				<p>system software with realistic constraints.</p> <ol style="list-style-type: none"> 3. Ability to conduct experiments, gather data, analyze and interpret results for investigating solutions to real life applications with assembly language programming and Unix shell programming. 4. Ability to devise, select, and use modern techniques and tools needed for the design and implementation of system programs.
21	MSCS -304-GE-B	Computer Algorithms	2017	<ol style="list-style-type: none"> 1. Apply design principles and concepts to algorithm design (c) 2. Have the mathematical foundation in analysis of algorithms (a, j) 3. Understand different algorithmic design strategies (j) 4. Analyze the efficiency of algorithms using time and space complexity theory (b)
22	MSCS -304-GE-C	UID Using .NetTechnologies	2017	<ol style="list-style-type: none"> 1. Provide a consistent, object-oriented programming environment whether

				<p>object code is stored and executed locally, executed locally but web distributed, or executed remotely.</p> <ol style="list-style-type: none"> 2. Build all communication on industry standards to ensure that code based on .NET Framework integrates with any other code. 3. Building multi-tier enterprise applications. 4. Client-side programming: HTTP, CGI, Cookies, JavaScript, HTML, XML.
23	MSCS -304-GE-D	IT in Forensic Science	2017	<ol style="list-style-type: none"> 1. Approach analysis of evidence without bias. 2. Develop a conceptual understanding of criminal justice system, rules of evidence, legal system. 3. develop professional, ethical graduates whose competence in problem-solving, legal analysis and application, quantitative reasoning, investigation and scientific laboratory procedures can be applied to immediate employment or

				advanced study.	
24	MSCS GE-E	-304-	Software Testing	2017	<ol style="list-style-type: none"> 1. Various test processes and continuous quality improvement, Types of errors and fault models. 2. Methods of test generation from requirements. 3. Behavior modeling using UML: Finite state machines (FSM), Test generation from FSM models, Input space modeling using combinatorial designs. 4. Combinatorial test generation, Test adequacy assessment using: control flow, data flow, and program mutations, The use of various test tools. 5. Application of software testing techniques in commercial environments.
25	MSCS GE-A	-305-	Cloud Computing	2017	<ol style="list-style-type: none"> 1. Understand the concepts, characteristics, delivery models and benefits of cloud computing 2. Understand the key security and compliance challenges of cloud computing

				<ol style="list-style-type: none"> 3. Understand the key technical and organisational challenges 4. Understand the different characteristics of public, private and hybrid cloud deployment models.
26	MSCS -305 GE-B	Big Data Analytics	2017	<ol style="list-style-type: none"> 1. Understand Big Data and its analytics in the real world, Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics. 2. Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm, Design and Implementation of Big Data Analytics using pig and spark to solve data intensive problems and to generate analytics. 3. Implement Big Data Activities using Hive.
27	MSCS -305 GE-C	Artificial Neural Networks	2017	<ol style="list-style-type: none"> 1. Know the main provisions neuro mathematics, Know the main types of neural networks; 2. Know and apply the methods of training

				<p>neural networks;</p> <p>3. Know the application of artificial neural networks;</p> <p>4. To be able to formalize the problem, to solve it by using a neural network.</p>
28	MSCS -305 GE-D	Cyber Security	2017	<p>1. Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure.</p> <p>2. Design, develop, test and evaluate secure software.</p> <p>3. Develop policies and procedures to manage enterprise security risks.</p> <p>4. Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training.</p> <p>5. Interpret and forensically investigate security incidents.</p>
29	MSCS -305 GE-E	Mobile App Development	2017	<p>1. Describe those aspects of mobile programming that make it unique from programming for other platforms,</p> <p>2. Critique mobile applications on their</p>

				<p>design pros and cons,</p> <p>3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,</p> <p>4. Program mobile applications for the Android operating system that use basic and advanced phone features, and</p> <p>5. Deploy applications to the Android marketplace for distribution.</p>
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40. Commerce

M.Com (Regular)

S. No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Accounting Standards & Reporting	2017	<p>i. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation</p> <p>ii. Impart the ability to find out the cash flows and provide the skills to value goodwill</p> <p>iii. Create awareness about IFRS and segment reporting</p>
2	102.	Financial	2017	<p>i. Describe meaning, functions and objectives; role of financial</p>

		Management		<p>manager.</p> <p>ii. Examine investment decision, capital budgeting, techniques of CB and methods of CB.</p> <p>iii. Investigate management of working capital, needs and concepts.</p> <p>iv. Asses financing decision, capital structure and capital theories.</p> <p>v. Design dividend decision and theories of dividend.</p>
3	103.	Business Environment and Policy	2017	<p>i. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment.</p> <p>ii. Illustrates economic environment nature and scope and new economic policy.</p> <p>iii. Develop political, legal environment; reasons for state intervention and government business interface.</p> <p>iv. Study the socio cultural environment nature, impact of social responsibility and business ethics.</p> <p>v. Interpret global environment; benefits and problems of MNCs and WTO.</p>
4	104.	Organisational Behaviour	2017	<p>i. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation</p>

				<p>ii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts.</p> <p>iii. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.</p>
5	105a	Quantitative Techniques for Business Decisions	2017	<p>i. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions.</p> <p>ii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions.</p> <p>iii. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.</p>
7	201	Advanced cost Accounting	2017	<p>i. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting;</p> <p>ii. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits.</p>

				<p>iii. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets.</p> <p>iv. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial Markets and Services	2017	<p>i. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market.</p> <p>ii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>iii. Create plans and understand the metrics for getting finance from venture capital firms.</p>
9	203.	Strategic Financial Management	2017	<p>i. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>ii. Explain Strategic financial management success factors and constraints.</p> <p>iii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>iv. Identify financial distress and restructuring; countering financial</p>

				<p>distress.</p> <p>v. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2017	<p>i. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>ii. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>iii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>iv. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205a	Working Capital Management	2017	<p>i. To impart basic knowledge on working capital concepts and source of WCand to provide the skills to estimate working capital</p> <p>ii. To enables the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>iii. To provide the skills of inventory management with different</p>

				techniques.
12	206a	e-Banking Operations	2017	<ul style="list-style-type: none"> i. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India. ii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications. iii. Categorize the financial frauds in e-banking sector.
13	301	Security Analysis and Portfolio Management	2017	<ul style="list-style-type: none"> i. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models. ii. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's performance index. iii. Synthesize portfolio revision, need and strategies.
14	302.	Accounting for Managerial	2017	<ul style="list-style-type: none"> i. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand

		Decisions		<p>different managerial decisions influencing short and long-term financing.</p> <p>ii. Study the concept of Responsibility Accounting and its uses and trends.</p> <p>iii. Know the essential parameters for evaluation of divisional performance and the emerging issues today</p> <p>iv. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.</p>
15	303a.	Tally with GST Application	2017	<p>i. To acquaint oneself with skills to prepare financial statements through Tally ERP.</p> <p>ii. To understand basics of GST system and to know steps involved in generating GSTR reports.</p> <p>iii. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.</p>
16	303c.	Tax planning & Management	2017	<p>i. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads</p> <p>ii. Acquire the knowledge on tax planning with regard to location</p> <p>iii. To provide the skills of tax planning regard to managerial decisions</p>

				and create awareness about tax incentive of exports.
18	305a	Fundamentals of Accounting	2017	<ul style="list-style-type: none"> i. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts ii. To help the students to acquire the skills of financial statement analysis iii. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.
19	401	Financial Derivatives	2017	<ul style="list-style-type: none"> i. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions. ii. Prioritise options in financial derivatives and option pricing models. iii. Compose swap market futures, types and interest rate; pricing swaps. iv. Synthesize stock index futures, options and trading of stock futures and options.
20	402.	Project Planning & Control	2017	<ul style="list-style-type: none"> i. Define a project and operations of corporate long range planning and phases of capital budgeting. ii. Distinguishes project ideas and technical analysis, project rating

				<p>index and methods of forecasting.</p> <p>iii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>iv. Understand Social cost benefit analysis and methods of SCBA</p> <p>v. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403a.	Insurance Management	2017	<p>i. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>ii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>iii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon.</p> <p>iv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>v. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>

23	405a	Security Market Operations	2017	<ul style="list-style-type: none"> i. Learn the basic concepts of Indian securities market. ii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE. iii. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensx and NSE indices.
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M.Com Accounting & Finance:

S. No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Accounting Standards & Reporting	2017	<ul style="list-style-type: none"> iv. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation v. Impart the ability to find out the cash flows and provide the skills to value goodwill vi. Create awareness about IFRS and segment reporting
2	102.	Financial Management	2017	<ul style="list-style-type: none"> vi. Describe meaning, functions and objectives; role of financial manager. vii. Examine investment decision, capital budgeting, techniques of CB and methods of CB. viii. Investigate management of working capital, needs and concepts.

				<p>ix. Asses financing decision, capital structure and capital theories.</p> <p>x. Design dividend decision and theories of dividend.</p>
3	103.	Business Environment and Policy	2017	<p>vi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment.</p> <p>vii. Illustrates economic environment nature and scope and new economic policy.</p> <p>viii. Develop political, legal environment; reasons for state intervention and government business interface.</p> <p>ix. Study the socio cultural environment nature, impact of social responsibility and business ethics.</p> <p>x. Interpret global environment; benefits and problems of MNCs and WTO.</p>
4	104.	Organisational Behaviour	2017	<p>iv. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation</p> <p>v. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts.</p> <p>vi. Obtain knowledge on Organization dynamics as to organization culture,</p>

				organizational change and know the significance of OB today.
5	105a	Quantitative Techniques for Business Decisions	2017	<p>iv. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions.</p> <p>v. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions.</p> <p>vi. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.</p>
7	201	Advanced cost Accounting	2017	<p>v. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting;</p> <p>vi. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits.</p> <p>vii. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets.</p> <p>viii. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial	2017	iv. To understand the framework of Indian financial system and money

		Markets and Services		<p>market and evaluate the metrics of primary market and secondary capital market.</p> <p>v. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>vi. Create plans and understand the metrics for getting finance from venture capital firms.</p>
9	203.	Strategic Financial Management	2017	<p>vi. Describe strategic management concept, importance and purpose; strategic planning concept and characteristics,</p> <p>vii. Explain Strategic financial management success factors and constraints.</p> <p>viii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>ix. Identify financial distress and restructuring; countering financial distress.</p> <p>x. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2017	<p>v. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the</p>

				<p>best practices.</p> <p>vi. Gain Knowledge on the historical backdrop of CG in India and the guidelines pronounced by various committees for effective practice in India.</p> <p>vii. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>viii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>
11	205a	Working Capital Management	2017	<p>iv. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>v. To enable the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>vi. To provide the skills of inventory management with different techniques.</p>
12	206a	e-Banking Operations	2017	<p>iv. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>v. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking</p>

				<p>applications.</p> <p>vi. Categorize the financial frauds in e-banking sector.</p>
13	301	Security Analysis and Portfolio Management	2017	<p>iv. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models.</p> <p>v. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; sharpe's, treynor's and Jensen's performance index.</p> <p>vi. Synthesize portfolio revision, need and strategies.</p>
14	302.	Accounting for Managerial Decisions	2017	<p>v. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing.</p> <p>vi. Study the concept of Responsibility Accounting and its uses and trends.</p> <p>vii. Know the essential parameters for evaluation of divisional performance and the emerging issues today</p> <p>viii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.</p>

15	303a.	Tally with GST Application	2017	<p>iv. To acquaint oneself with skills to prepare financial statements through Tally ERP.</p> <p>v. To understand basics of GST system and to know steps involved in generating GSTR reports.</p> <p>vi. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.</p>
16	303c.	Tax planning & Management	2017	<p>iv. To comprehend the basic knowledge about tax concepts and planning and To provide knowledge on sources of income under different heads</p> <p>v. Acquire the knowledge on tax planning with regard to location</p> <p>vi. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.</p>
18	305a	Fundamentals of Accounting	2017	<p>iv. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts</p> <p>v. To help the students to acquire the skills of financial statement analysis</p> <p>vi. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.</p>
19	401	Financial Derivatives	2017	<p>v. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts</p>

				<p>concepts, types, uses and functions.</p> <p>vi. Prioritise options in financial derivatives and option pricing models.</p> <p>vii. Compose swap market futures, types and interest rate; pricing swaps.</p> <p>viii. Synthesize stock index futures, options and trading of stock futures and options.</p>
20	402.	Project Planning & Control	2017	<p>vi. Define a project and operations of corporate long range planning and phases of capital budgeting.</p> <p>vii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>viii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>ix. Understand Social cost benefit analysis and methods of SCBA</p> <p>x. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403a.	Insurance Management	2017	<p>vi. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>vii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>viii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement</p>

				<p>thereon.</p> <p>ix. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>x. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>
23	405a	Security Market Operations	2017	<p>iv. Learn the basic concepts of Indian securities market.</p> <p>v. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>vi. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensex and NSE indices.</p>

Financial Management

S. No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	101	Accounting Standards & Reporting	2017	<p>vii. Increase the knowledge of students on accounting principles and standards and To enable the students to do inventory valuation</p> <p>viii. Impart the ability to find out the cash flows and provide the skills to value goodwill</p> <p>ix. Create awareness about IFRS and segment reporting</p>
2	102.	Financial Management	2017	<p>xi. Describe meaning, functions and objectives; role of financial manager.</p> <p>xii. Examine investment decision, capital budgeting, techniques of CB and methods of CB.</p> <p>xiii. Investigate management of working capital, needs and concepts.</p> <p>xiv. Asses financing decision, capital structure and capital theories.</p> <p>xv. Design dividend decision and theories of dividend.</p>
3	103.	Business Environment and Policy	2017	<p>xi. Examine business environment, concept, nature and scope; scanning, monitoring, changing dimensions of business environment.</p> <p>xii. Illustrates economic environment nature and scope and new economic policy.</p> <p>xiii. Develop political, legal environment; reasons for state intervention and</p>

				<p>government business interface.</p> <p>xiv. Study the socio cultural environment nature, impact of social responsibility and business ethics.</p> <p>xv. Interpret global environment; benefits and problems of MNCs and WTO.</p>
4	104.	Organisational Behaviour	2017	<p>vii. Acquire knowledge on the conceptual frame work and emerging issues of OB and Study different theories of personality and motivation</p> <p>viii. Form a clear idea on group dynamics and inculcate the skills to become a leader and Learn about Organizational structures and clear understanding of management of Interpersonal conflicts.</p> <p>ix. Obtain knowledge on Organization dynamics as to organization culture, organizational change and know the significance of OB today.</p>
5	105a	Quantitative Techniques for Business Decisions	2017	<p>vii. Appreciate the use of quantitative techniques, methods of business forecasting and quantitative techniques in business decisions.</p> <p>viii. Formulate F distribution and multiple co-relations co-efficient and study probability and non-probability distributions.</p> <p>ix. Formulate sampling theory, testing of hypothesis and type I and type II errors and Identify linear programming advantages and disadvantages; graphical and simplex method.</p>

7	201	Advanced cost Accounting	2017	<p>ix. Obtain knowledge on the concept of cost accounting and know how it is different from financial and management accounting;</p> <p>x. Understand the features and objectives of process costing and calculation of process losses and Inter-process profits.</p> <p>xi. Know the concept of equivalent production and accounting treatment for joint and by-products and acquire knowledge on budgetary control and preparation of various functional budgets.</p> <p>xii. Perceive the significance of ABC in cost ascertainment and control.</p>
8	202.	Financial Markets and Services	2017	<p>vii. To understand the framework of Indian financial system and money market and evaluate the metrics of primary market and secondary capital market.</p> <p>viii. Demonstrate the role of merchant bankers and to analyze the metrics involved in credit rating the financial instruments issued by companies in primary market.</p> <p>ix. Create plans and understand the metrics for getting finance from venture capital firms.</p>
9	203.	Strategic	2017	<p>xi. Describe strategic management concept, importance and purpose;</p>

		Financial Management		<p>strategic planning concept and characteristics,</p> <p>xii. Explain Strategic financial management success factors and constraints.</p> <p>xiii. Illustrate corporate valuation approaches and guidelines; value based management.</p> <p>xiv. Identify financial distress and restructuring; countering financial distress.</p> <p>xv. Justify corporate sickness and financial engineering; fund raising and fund deployment strategies.</p>
10	204.	Corporate Governance	2017	<p>ix. Obtain knowledge on CG Mechanism and emerging issues in CG and Know the genesis of CG in China USA and UK and also the code of the best practices.</p> <p>x. Gain Knowledge on the historical backdrop of CG in India and the guild lines pronounced by various committees for effective practice in India.</p> <p>xi. Discern knowledge on the composition of Board of Directors and Audit Committees and know the role of internal Auditors in India.</p> <p>xii. Understand the CG standards and practices in India with focus on IT and futures of CG in India.</p>

11	205a	Working Capital Management	2017	<p>vii. To impart basic knowledge on working capital concepts and source of WC and to provide the skills to estimate working capital</p> <p>viii. To enable the students familiarise with the cash management techniques and comprehend the concept of receivables and its management.</p> <p>ix. To provide the skills of inventory management with different techniques.</p>
12	206a	e-Banking Operations	2017	<p>vii. To understand the RBI's financial norms to be followed by commercial banks and to investigate into the roles of various commercial banks in India.</p> <p>viii. To analyze the mechanism of offline and online borrowing and lending of funds and familiarize with merits and demerits of e-banking applications.</p> <p>ix. Categorize the financial frauds in e-banking sector.</p>
13	301	Security Analysis and Portfolio Management	2017	<p>vii. Find security analysis, basics of investment and objectives; fundamental analysis and technical analysis and outline valuation of securities, constant growth and multiple growth models.</p> <p>viii. Illustrate portfolio theory, CAPM, SML and APT models and investigate portfolio evaluation; Sharpe's, Treynor's and Jensen's</p>

				<p>performance index.</p> <p>ix. Synthesize portfolio revision, need and strategies.</p>
14	302.	Accounting for Managerial Decisions	2017	<p>ix. Learn the concept of management accounting, cost analysis for pricing decision and different methods of pricing and understand different managerial decisions influencing short and long-term financing.</p> <p>x. Study the concept of Responsibility Accounting and its uses and trends.</p> <p>xi. Know the essential parameters for evaluation of divisional performance and the emerging issues today</p> <p>xii. Obtain comprehensive knowledge on management reporting and reporting practices of Indian corporates.</p>
15	303a.	Tally with GST Application	2017	<p>vii. To acquaint oneself with skills to prepare financial statements through Tally ERP.</p> <p>viii. To understand basics of GST system and to know steps involved in generating GSTR reports.</p> <p>ix. To know the metrics in calculation and generation of TDS and service tax reports and to acquire skills to create payroll receipts.</p>
16	303c.	Tax planning	2017	<p>vii. To comprehend the basic knowledge about tax concepts and planning</p>

		& Management		and To provide knowledge on sources of income under different heads viii. Acquire the knowledge on tax planning with regard to location ix. To provide the skills of tax planning regard to managerial decisions and create awareness about tax incentive of exports.
18	305a	Fundamental s of Accounting	2017	vii. To provide basic knowledge on accounting and its preparation and enable the students to prepare final accounts viii. To help the students to acquire the skills of financial statement analysis ix. To provide the basic knowledge on cost accounting and develop the student ability to use the tools of management accounting.
19	401	Financial Derivatives	2017	ix. Outline financial derivatives concepts, features and types; traders in financial derivatives markets and identify forwards and future contracts concepts, types, uses and functions. x. Prioritise options in financial derivatives and option pricing models. xi. Compose swap market futures, types and interest rate; pricing swaps. xii. Synthesize stock index futures, options and trading of stock futures and options.
20	402.	Project Planning &	2017	xi. Define a project and operations of corporate long range planning and phases of capital budgeting.

		Control		<p>xii. Distinguishes project ideas and technical analysis, project rating index and methods of forecasting.</p> <p>xiii. Illustrates financial analysis project planning, forms of project organization and performance evaluation of project.</p> <p>xiv. Understand Social cost benefit analysis and methods of SCBA</p> <p>xv. Contrast public projects context of Indian projects, approval procedure and guidelines for preparation of feasibility report.</p>
21	403a.	Insurance Management	2017	<p>xi. Perceive the concept of RM, Socio-economic relevance, regulatory framework and latest development in Insurance sector.</p> <p>xii. Acquire knowledge on various types of life insurance policies and the terminology relating to the concept of insurance.</p> <p>xiii. Understand different types of non-life insurance with reference to marine and fire insurance and their progress and claim settlement thereon.</p> <p>xiv. Seek awareness on miscellaneous insurance including health, personal accident crop insurance and practical problems in implementation and claim settlement.</p> <p>xv. Understand different aspects of management of investments of funds by LIC and GIS, Legal restrictions on their investments. Also exhibit the global insurance scenario and future prospects of India insurance.</p>

23	405a	Security Market Operations	2017	<p>vii. Learn the basic concepts of Indian securities market.</p> <p>viii. Explore the areas of secondary markets in special reference to SEBI guidelines and exemplify about listing of securities in BSE and NSE.</p> <p>ix. Investigate into Indian stock exchanges and Illustrate about stock market with special reference to BSE sensx and NSE indices.</p>
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SVU College of Pharmaceutical Sciences

41.B. Pharmacy:

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
4	BPH 102	English & Soft Skills	2017	<p>1.To equip students with Pre-presentations and to understand the structure of a good presentation and devise various techniques for delivering a successful presentation. To help students overcome stage fear and take questions.</p> <p>2.To enable the students to become global citizens.</p> <p>3.This course will prepare the young pharmacy student to interact effectively with doctors,</p>

				<p>nurses and other health workers.</p> <p>4. At the end of the course the students will get the soft skills set to work cohesively with the team as a team player and add value to the pharmaceutical business.</p>
5	BPH 103	Pharmaceutical. Inorganic Chemistry	2017	<p>1. To understand the history and concept of pharmacopoeia and its editions.</p> <p>2. Knowledge about the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals.</p> <p>3. Identification of limit tests of different pharmaceutical inorganic compounds.</p> <p>4. To understand the method to prepare inorganic pharmaceuticals.</p> <p>5. To justify the medicinal importance of acidifiers, antacids, cathartics and antimicrobial agents as gastrointestinal agents.</p> <p>6. To discuss the handling and applications of radiopharmaceuticals.</p>
6.	BPH 104	Pharmaceutical Organic Chemistry-I	2017	<p>1. Guess and write the structure, systematic/ trivial name, and pharmaceutical uses (if any) associated with the specified organic compounds.</p>

				<p>2. Understand the general concept of isomerism and distinguish structural isomers.</p> <p>3. Infer the chemical nature of the compounds on the basis of qualitative chemical tests.</p> <p>4. Understand the significance of certain electronic effects with respect to the reactivity/ stability of organic compounds specified.</p> <p>5. Understand and gain insight into the organic reactions by analyzing their fair reaction mechanisms</p>
7.	BPH 105	Human Anatomy and Physiology	2017	<p>1. Know the fundamental knowledge on the structure and functions of the various systems of the human body.</p> <p>2. understanding all the homeostatic mechanisms of the body</p> <p>3. Understand the relationship of anatomy with various disciplines of pharmacy.</p> <p>4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition</p>
8.	BPH 106	Pharmaceutical Inorganic Chemistry	2017	<p>1. To recall the sources of limit tests, preparation</p>

		Practicals		<p>and identification of compounds.</p> <p>2. To demonstrate the preparation of inorganic pharmaceuticals</p> <p>3. To apply knowledge to perform modified limit tests.</p> <p>4. To analyze various inorganic pharmaceutical compounds.</p> <p>5. To select suitable method for the preparation of inorganic pharmaceuticals.</p> <p>6. To assess quality of inorganic pharmaceuticals.</p>
9.	BPH 107	Pharmaceutical Organic Chemistry-I Practicals	2017	<p>1. Assess the identity in terms of the physico-chemical properties of the compounds of specified chemical classes</p> <p>2. Get hands- on- experience in basic techniques of organic synthesis</p>
10.	BPH 108	Human Anatomy and Physiology Practicals	2017	<p>1. Differentiate the structures of the various systems of the human body.</p> <p>2. Perform the experiments like blood cell count, hemoglobin content, bleeding and clotting time and various physiological Parameters</p>

				<p>theoretically and practically.</p> <p>3. Identify the structural (microscopically and macroscopically) and functional details about different organ systems such as cardiovascular, lymphatic, digestive, muscular system</p>
11	BPH 109	General & Dispensing Pharmacy	2017	Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product
12	BPH 110	Pharmaceutical Organic Chemistry-II	2017	<p>1. Guess and write the structure, systematic/ trivial name, and pharmaceutical uses (if any) associated with the specified organic compounds.</p> <p>2. Understand the general concept of isomerism and distinguish structural isomers.</p> <p>3. Infer the chemical nature of the compounds on the basis of qualitative chemical tests.</p> <p>4. Understand the significance of certain electronic effects with respect to the reactivity/ stability of organic compounds specified.</p> <p>5. Understand and gain insight into the organic</p>

				reactions by analyzing their fair reaction mechanisms
13	BPH 111	Computer applications	2017	<p>1 know the various types of application of computers in pharmacy profession</p> <p>2. know the various types of databases used in profession</p> <p>3. know the usage of softwares in pharmacy</p>
14	BPH 112	Pharmacognosy I	2017	The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially. Also this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine.
15	BPH 113	Human Anatomy and Physiology and Pathophysiology	2017	<p>1.Identifies Name the signs, symptoms and complications of the diseases.</p> <p>2.Students Get thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic</p>

				<p>pathophysiological mechanisms.</p> <p>3.To Study the aetiology and pathogenesis of the selected disease states</p> <p>4.The baseline knowledge required to practice medicine safely, confidently, rationally and effectively.</p>
16	BPH 114	General & Dispensing Pharmacy Practicals	2017	This is help to understand the basic information of formulation process and how to optimise quality control solid, semisolid and parenteral dosage forms
17	BPH 115	Pharmaceutical Organic Chemistry-II Practicals	2017	This subject is designed to impart fundamental knowledge on the structure,chemistry and therapeutic value of drugs. The subjectemphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism ofdrugs. The syllabus also emphasizes on chemicalsynthesis of important drugs under each class
18	BPH 116	Computer applications Practicals	2017	<ol style="list-style-type: none"> 1. know the various types of application of computers in pharmacy profession 2. know the various types of databases used in

				profession 3. know the usage of softwares in pharmacy
19	BPH 117	Pharmacognosy I Practicals	2017	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents by use chromatographic technique
20	BPH 201	Physical pharmacy –I (Theory)	2017	1.The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. 2.Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.
21	BPH 202	Pharmaceutical Engineering (Theory)	2017	1. To know various unit operations involved in manufacturing of pharmaceuticals. 2. To understand the concepts of flow of fluids, size reduction and size separation. 3 To perform different mechanisms of heat transfer. 4 To compare and contrast different types of

				<p>evaporation and distillation process.</p> <p>5 To determine the factors influencing mixing, filtration and centrifugation.</p> <p>6 To elaborate various preventive methods used for corrosion control in pharmaceutical industries.</p>
22	BPH 203	Pharmaceutical organic chemistry III (Theory)	2017	<ul style="list-style-type: none"> • Guess and write the structure according to the stereochemical specifications. • Fairly understand the aspects of heterocyclic chemistry in terms of naming and reactivity. • Assess and understand the pharmaceutical applications and importance of the specified named reactions.
23	BPH 204	Pharmaceutical Biochemistry (Theory)	2017	<p>1. Understand the principles of various fields of chemistry and biology (organic chemistry, analytical chemistry, biochemistry, genetics, metabolism, and molecular biology)</p> <p>2. Develop as independent thinkers who are responsible for their own learning. Develop transferable quantitative skills.</p>

24	BPH 205	Environmental studies (Theory)	2017	<p>This program shall create an awareness about environmental problems, develop an attitude towards of concern for the environment.</p> <p>2 To compare the natural, renewable and non-renewable resources and the problems associated with them.</p> <p>3 To motivate the learners to participate in environment protection and improvement.</p> <p>4 To analyze the concepts of eco system including structure and functions.</p> <p>5 To adopt skills in identifying and solving environmental problems.</p> <p>6 To develop an attitude of concern for the environment</p>
25	BPH 206	Physical pharmacy –I (Practical)	2017	<p>This course helps to compare and evaluate the solubility of various combination compound modify for better solubility approaches by use different level of methods</p>
26	BPH 207	Pharmaceutical Engineering (Practical)	2017	<p>To understand the basic principles involved in unit operations such as size reduction, size separation, distillation and drying.</p>

				<ol style="list-style-type: none"> 2. To demonstrate and explain about the construction, working and applications of pharmaceutical equipment's such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer. 3. To experiment with the process variables of filtration, evaporation and infer the same. 4. To determine radiation constant of brass, iron, unpainted and painted glass. 5. To determine overall heat transfer coefficient by heat exchanger and calculate the efficiency of steam distillation. 6. To estimate moisture content, loss on drying and construct drying curves for calcium carbonate and starch.
27	BPH 208	Pharmaceutical organic chemistry III (Practical)	2017	<ol style="list-style-type: none"> 1. Guess and write the structure, systematic/trivial name, and pharmaceutical uses (if any) associated with the specified organic compounds. 2. Understand the general concept of isomerism and distinguish structural isomers.

				<ol style="list-style-type: none"> 3. Infer the chemical nature of the compounds on the basis of qualitative chemical tests. 4. Understand the significance of certain electronic effects with respect to the reactivity/ stability of organic compounds specified. 5. Understand and gain insight into the organic reactions by analyzing their fair reaction mechanisms
28	BPH 209	Pharmaceutical Biochemistry (Practical)	2017	<ol style="list-style-type: none"> .1. Understand the principles of various fields of chemistry and biology (organic chemistry, analytical chemistry, biochemistry, genetics, metabolism, and molecular biology) 2. Develop as independent thinkers who are responsible for their own learning. 3. Develop transferable quantitative skills.
29	BPH 210	Physical Pharmacy II (Theory)	2017	<ol style="list-style-type: none"> 1. The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations.

				<p>2. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms</p>
30	BPH 211	Pharmaceutical Analysis I (Theory)	2017	<p>1) To understand selected instrumental analytical techniques (spectroscopic and chromatographic methods) and differentiate with volumetric analysis.</p> <p>To gain knowledge on interaction of EMR with matter and to build the analytical understanding at the level of atom, group and molecular structure of organic and inorganic compounds with different functional groups and their applications in pharmacy.</p> <p>3) To maximize knowledge on characterization and estimation of ions by spectroscopical techniques</p> <p>4) To simplify affinity of matter with stationary phase and mobile phase, physical and chemical.</p>
31	BPH 212	Pharmaceutical Technology I (Theory)	2017	<p>1. basic concepts in the field of drug delivery systems that is used in</p>

				<p>Pharmaceutical Technology.</p> <ol style="list-style-type: none"> 2. uses pharmaceutical information sources medical 3. Lists in the form of liquid drug delivery systems. 4. Defines the concepts of dissolution, solubility and stability. 5. Design Solution formulations.
32	BPH 213	Pharmacognosy II (Theory)	2017	<p>This subject is intended to impart students about the fundamental knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially, involved in the study of producing plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine.</p> <ol style="list-style-type: none"> 1. Significance of pharmacognostic parameters & study of crude drugs. 2. Understand the underlying reason of evolutionary significance of secondary metabolites production in plants & other organisms & deduce their significance as

				<p>medicinal molecules.</p> <p>3. How these primarymetabolites are used comprehensively as a source to develop Pharmaceutical & industrial applications.</p> <p>Study about the source, name, chemical structures, methods of extraction, qualitative & quantitative analysis of glycosides & tannin compounds of plant origin.</p>
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33	BPH 214	Pharmacoinformatics & Basics in drug discovery (Theory)	2017	<ol style="list-style-type: none"> 1. Thorough Knowledge on Bioinformatics and its classification. 2. Importance of of drug discovery, lead molecules in the preparation of drugs in pharmaceutical industries. 3. Good information about drug design, ligand – receptor mechanism and its applications. 4. How this subject is collaborate with other disciplinary subjects, Understanding Genomics &transcriptomics.
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34	BPH 215	Pharmaceutical pharmacy II (Practical)	2017	This course helps to compare and evaluate the solubility of various combination compound modify for better solubility approaches by use different level of methods
35	BPH 216	Pharmaceutical Analysis I (Practical)	2017	<ol style="list-style-type: none"> 1. Discusses the effect of impurities on the quality of drugs and behavioural pattern of drugs 2. Aids in understanding the SOP and usage of software associated with various analytical instruments <p>Helps in gaining knowledge of interpretation of spectra and of chromatograms</p>
36	BPH 217	Pharmaceutical technology I (Practical)	2017	<ol style="list-style-type: none"> 1.Preparing the solutions 2.Preparing the emulsions 3.Preparing the syrups 4.Preparing the semisolid dosage forms
37	BPH 218	Pharmacognosy II (Practical)	2017	<ol style="list-style-type: none"> 1. Demonstrate chemical tests to identify unorganized crude drugs 2. Evaluate the quality and purity of crude drugs 3. Perform linear measurements for crude drug identification <p>Develop quality control methods for standardisation</p>

				of herbal drugs
38	BPH 301	Pharmaceutical Technology-II	2017	Course enables the student to understand and appreciate the influence of pharmaceutical manufacture of various pharmaceutical dosage forms on the performance of the drug product by use of specific technology
39	BPH 302	Medicinal chemistry - I	2017	<ol style="list-style-type: none"> 1. Gain knowledge on physicochemical and biological aspects of various drug classes. 2. Judge the effect of structural modifications with respect to biological activity <p>Develop awareness about the application of organic synthesis with respect to preparation of drugs</p>
40	BPH 303	Pharmacology - I	2017	<ol style="list-style-type: none"> 1. Gain knowledge on pharmacokinetic and pharmacodynamic aspects of drugs in general. 2. Develop understanding about physiological, pathological, and pharmacological concepts of nervous system.
41	BPH 304	Pharmaceutical microbiology	2017	1. To know the various types of sterile products with their formulation in large scale industries.

				2.To acquire knowledge on GMP standards sanitation, personal hygiene in sterile product manufacturing facilities.
41	BPH 305	Drug store and Industrial Management and Marketing	2017	1.This course helps to understand the students how to establish the drug store and functioning the proper channels and also procurement and dispensing of drugs procedure as per government norms. 2. Gain knowledge on functioning and management of pharma industry and know the regulating process in all aspects
42	BPH 306	Pharmaceutical Technology-II	2017	This course helps to Identify, formulate, research on pharmaceutical solid and parenteral dosage form and solve complex problems in quality control of product
43	BPH 307	Medicinal chemistry-I practicals	2017	This course helps to how to separation and identification compound given unknown mixture. It imparts take it knowledge on crude separation and identification technique
44	BPH 308	Pharmaceutical Microbiology practicals	2017	1.This course help to able to understand the different levels of microorganism growth at different conditions. 2.Gain knowledge of the various types of sterile

				products with their formulation in large scale industries and acquire knowledge on GMP standards sanitation, personal hygiene in sterile product manufacturing facilities
45	BPH 309	Medicinal chemistry-II (theory)	2017	<ol style="list-style-type: none"> 1. Gain knowledge on physicochemical and biological aspects of various drug classes. 2. Judge the effect of structural modification with respect to biological activity 3. Develop awareness about the application of organic synthesis with respected preparation of drugs
46	BPH310	Pharmacology II– Theory	2017	<ol style="list-style-type: none"> 1. In continuation with the previous semester, this subject would have continued describing about the different drugs used for the treatment of diseases. 2. Students understood the mechanism of drug action and its relevance in the treatment of different diseases. 3. Have understood about the drugs used to treat respiratory disorders, metabolic disorders, coagulants and anti-coagulants. 4. Recognise and explain the rationales behind the use of widely used, national organization approved treatment for the management and treatment of

				<p>common diseases and conditions.</p> <p>5. Gained knowledge on the new targets of several disease conditions for the treatment</p>
47	BPH311	Pharmaceutical. Analysis II(Theory)	2017	<p>1.Gain knowledge on identification of functional groups of various drugs and other excipients.</p> <p>2.Judge the chemical interaction between the compound that effect on structural modification ions with respect to biological activity</p> <p>3.Develop awareness about the analytical equipment which are help to obtain a good quality control of pharmaceutical formulation as per pharmacopeia's</p>
48	BPH312A	Forensic Pharmacy– Theory	2017	<p>1.To recall the pharmaceutical legislations, ethics, right to information, medical termination of pregnancy and intellectual property rights.</p> <p>2.To relate the significance of Drugs and cosmetics act 1940 and its rules 1945 in relation to import and manufacture of drugs.</p> <p>3. To apply the knowledge on schedules pertaining to Drugs and cosmetics act 1940 and its rules 1945 and also administration of the act and rules.</p> <p>4. To understand the functions of pharmacy councils</p>

				<p>and implementation of education regulations in pharmacy.</p> <p>5. To appraise the importance of medicinal and toilet preparations act and narcotic drugs and psychotropic substances act and rules.</p> <p>6 To discuss the salient features of drugs and magic remedies act, prevention of cruelty to animals’ act and drugs price control order.</p>
49	BPH312B	Clinical Trials– Theory	2017	<p>1.Know the regulatory requirements for conducting clinical trial</p> <p>2.To understand the various types of clinical trial designs</p> <p>3.To gain knowledge on basic concepts and establishment of pharmacovigilance</p> <p>4.To know the ADRreporting, methods and tools used in pharmacovigilance</p>
50	BPH312 C	Industrial.Pharmacy & Cosmetic Technology– Theory	2017	
51	BPH313	Medicinal Chemistry-II Practicals	2017	<p>This course helps to how to separation and identification compound given unknown mixture.</p> <p>It imparts take it knowledge on crude separation and identification technique</p>

52	BPH314	Pharmacology-II Practicals	2017	<ol style="list-style-type: none"> 1. Handling of different instruments used in Experimental Pharmacology. 2. Know about the different routes of drug administration, blood withdrawal etc., 3. Evaluate the different activities on animals. 4. Demonstration of different simulation methods. 5. They would have finally learnt to apply the knowledge of drugs practically using simulated pharmacological experiments.
53	BPH315	Pharmaceutical. Analysis II Practicals	2017	<ol style="list-style-type: none"> 1. Handling of different analytical instruments. 2. Know about the different spectroscopy and chromatography techniques that helps to attain desired quality control of all pharmaceutical aspects as per the standard pharmacopoeias 5. Finally learnt to apply the knowledge to make good stability of pharmaceutical product by using of pharmaceutical analytical technical method.
54	BPH 401	Medicinal Chemistry-III	2017	<ol style="list-style-type: none"> 1. To develop an understanding of the physico-chemical properties of drugs. 2. To understand how current drugs were

				<p>developed by using pharmacophore modelling and docking technique.</p> <ol style="list-style-type: none"> 3. To acquire knowledge in the chemotherapy for cancer and microbial diseases and different anti-viral agents. 4. To acquire knowledge about the mechanism pathways of different class of medicinal compounds. 5. To have been introduced to a variety of drug classes and some pharmacological properties. 6. To acquire knowledge on thrust areas for further research
55	BPH 402:	Pharmacology-III	2017	<ol style="list-style-type: none"> 1. Students would have understood the pharmacological actions of different categories of drugs 2. They would have studied in detailed about mechanism of drug action at organ system/sub cellular/ macromolecular levels. 3. They would have understood the application of basic pharmacological knowledge in the prevention and treatment of various diseases. 4. They would have observed the effect of drugs on

				<p>animals by simulated experiments</p> <p>5. They would get an idea about correlation of pharmacology with other bio medical sciences.</p> <p>6. They would have understood the signal transduction mechanism of various receptors</p>
56	BPH 403:	Pharmacognosy-III	2017	<p>1. Terpenes, Polyphenols, Alkaloids, Pharmacology, Toxicity,</p> <p>2. Formulations and Preparations of Herbal Medicines.</p> <p>3. How herbs influence our physiology and can be helpful against several disorders.</p> <p>DNA Finger printing.</p>
57	BPH 404:	Biopharmaceutics & Pharmacokinetics	2017	<p>1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and them</p> <p>2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion,</p> <p>3. To understand the concepts of bioavailability and bioequivalence of drug products and them</p> <p>Understand various pharmacokinetic parameters, their significance & applications</p>

58	BPH 405A:	Chemistry Of Natural Products	2017	<ol style="list-style-type: none"> 1. To attain detailed knowledge about chemistry of medicinal compounds from natural origin. 2. To understand general methods of structural elucidation of medicinally active natural compounds. 3. To attain knowledge regarding isolation and purification of medicinal compounds from natural origin.
59	BPH 405B:	Hospital & Community Pharmacy	2017	<ol style="list-style-type: none"> 1. Discuss the roles and responsibilities of hospital pharmacist, hospital drug policies and guidelines for hospital pharmacy 2. Discuss various drug distribution methods in a hospital pharmacy 3. Apply various methods of inventory control 4. Formulate parenteral preparations Contribute to a newsletter for providing continuous education and awareness 5. Explain about handling and packaging of radiopharmaceuticals
60	BPH 405C	Pharmacovigilance	2017	<ol style="list-style-type: none"> 1. Explain the regulatory requirements for conducting clinical trial 2. Describe in detail about various types of clinical

				<p>trial designs</p> <ol style="list-style-type: none"> 3. Explain the responsibilities of key players involved in clinical trials 4. Describe the documentary requirements for Clinical trials 5. Explain Adverse drug reaction and its management 6. Describe basic concepts, and establishment of Pharmacovigilance 7. Explain ADR reporting, methods and tools used in Pharmacovigilance 8. Describe Pharmacoeconomics and safety pharmacology
61	BPH 406	Medicinal Chemistry-III Practicals	2017	<p>Synthesis compounds of medicinal interest</p> <ol style="list-style-type: none"> 2. Conduct monograph analysis of the pharmaceutical compounds 3. Determine the amount of drug present in an unknown solution 4. Estimate the purity of drugs by performing assays 5. Determine partition coefficient and dissociation constant of a given compound 6. Conduct planned experiments and prepare

				laboratory report in a standard format
62	BPH 407	Pharmacology-III Practicals	2017	<ol style="list-style-type: none"> 1. Demonstrate intraperitoneal and intramuscular routes of administration of drugs in animals and describe different anaesthetics used in laboratory animals 2. Identify and select laboratory appliances used in experimental pharmacology 3. Recommend the physiological salt solution for different isolated tissue preparations 4. Perform a bioassay procedure and create a Dose Response Curve 5. Demonstrate the screening of a drug for CNS activity 6. Conduct planned experiments and prepare laboratory report in a standard format
63	BPH 408	Pharmacognosy-III Practicals	2017	<ol style="list-style-type: none"> 1. Identify cell wall constituents and cell inclusions 2. Identify the crude drugs by its morphological characteristics and study the anatomical characters by preparing slides 3. Perform chemical tests to identify unorganized crude drugs and lipids 4. Prepare herbarium sheets 5. Conduct planned experiments and prepare

				laboratory report in a standard format
64	BPH 409	Biopharmaceutics & Pharmacokinetics Practicals	2017	<ol style="list-style-type: none"> 1. Compare the in-vitro drug release profile of different marketed products 2. Perform the solubility enhancement techniques for improvement of drug release of poorly water-soluble drugs 3. Estimate the bioavailability (absolute and relative) and bioequivalence from the given clinical data 4. Calculate the drug content in blood sample using Area Under Curve approach 5. Calculate and interpret various pharmacokinetic parameters from the given clinical data
65	BPH 410:	Novel Drug Delivery Systems	2017	<ol style="list-style-type: none"> 1. The use raw data and derive the pharmacokinetic models 2. and parameters the best describe the process of drug absorption, distribution, metabolism and elimination. 3. The critical evaluation of biopharmaceutic studies involving drug product equivalency. 4. The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.

				5. The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic
66	BPH 411	Pharmaceutical Biotechnology (Theory)	2017	<ol style="list-style-type: none"> 1. To know the basics of biotechnology techniques and the various systems used. 2. To understand the method of genetic engineering for production of rDNA products including monoclonal antibodies. 3. To clarify application of genetic engineering in animals. 4. To understand enzymes and their uses by immobilization. 5. To illustrate the use of fermenter for the production of fermentation products and purification by downstream process.
67	BPH 412:	Clinical Pharmacy & Therapeutics	2017	<ol style="list-style-type: none"> 1. Ability to apply the concepts of Pharmacokinetics to individualize the drug dosage regimen in clinical settings. 2. Ability to design a dosage regimen of a drug based on its route of administration 3. Ability to design and implement pharmacokinetic services

				4. Intravenous to Oral conversion of dosage regimens
68	BPH 413:	Comprehensive Viva Voce	2017	<ol style="list-style-type: none"> 1. There shall be a Comprehensive Viva-Voce in IV-year II semester. The Comprehensive Viva-Voce will be conducted by a committee consisting of Head of the Department and two Senior Faculty members of the Department. 2. The Comprehensive Viva-Voce is intended to assess the students understanding of the subjects he studied during the B. Tech. course of study. 3. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. <p>There are no internal marks for the Comprehensive Viva-Voce.</p>
69	BPH 414:	Project Work &Seminar	2017	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Bachelor of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied

				<p>elsewhere in the program, projects are undertaken individually or in small groups.</p> <p>5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.</p>

M.Pharmacy (Pharmacology)

S.No	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MPH 101A(Pharmacology)	General & Systemic Pharmacology	2017	<ol style="list-style-type: none"> 1. Describe the instruments in experimental pharmacology. 2. Know CPCSEA guidelines and OECD guidelines. 3. Know animal physiology with their

				<p>biochemical reference values in various animal species.</p> <p>4. Do collection of blood, body fluids and urine from experimental animals.</p> <p>5. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).</p>
2	MPH 102A(Pharmacology)	Clinical Pharmacology & Toxicology	2017	<p>1. The pathophysiology of selected disease states and the rationale for drug therapy.</p> <p>2. The controversies in drug therapy.</p> <p>3. The importance of preparation of individualized therapeutic plans based on diagnosis.</p> <p>4. Understanding the concepts of Clinical research;Therapeutic drug monitoring (TDM) ; concepts of Pharmacotherapeutics, Management & Current Good Clinical Practice of various diseases.</p> <p>5. Studying of various types, mechanisms of</p>

				Drug interaction; rational for drug combinations; Drug Toxicity and its prevention; Adverse drug reactions and its monitoring
3	MPH 103	Practical 1	2017	<ol style="list-style-type: none"> 1. Recording of concentration response curve (CRC) of acetylcholine 2. Record of the CRC of 5-HT on rat fundus preparation. 3. Record of the CRC of histamine on guinea pig ileum 4. Inotropic and chronotropic effects of drugs on isolated frog heart
4	MPH 104	Practical-II(MAT)	2017	<ol style="list-style-type: none"> 1. Explains the importance of modern instrumentation in pharmaceutical analysis 2. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms

5	MPH 105	Modern Analytical Techniques and biostatics Theory	2017	<ol style="list-style-type: none"> 1. Explains the importance of modern instrumentation in pharmaceutical analysis 2. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR. 3. Discusses the principle and applications of chromatographic techniques 4. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms. <p>Explains the concepts of Statistics and their applications in pharmacy</p>
6.	MPH 106	Human Values and Professional Ethics-I	2017	<ol style="list-style-type: none"> 1. Awareness of ethical issues and basic ethical approaches. 2. Improved writing skills and understanding of ethical conflict. 3. Enables students to develop ability for moral reasoning and act with ethical deliberations. 4. After studying ethics one is equipped with

				<p>the ethical sensitivity and moral understanding required to solve complex ethical dilemmas.</p> <p>5. Learn how to live peacefully</p>
7.	MPH 107	Comprehensive Viva	2017	<p>1. Know the fundamental knowledge on the structure and functions of the various systems of the human body.</p> <p>2. understanding all the homeostatic mechanisms of the body</p> <p>3. Understand the relationship of anatomy with various disciplines of pharmacy.</p> <p>4. Understand the dynamic constancy of the body, cell and its components, tissue and types of tissue, blood and its function and composition</p>
8.	MPH 201A (Pharmacology)	Molecular Pharmacology	2017	<p>1. Explain the modes of action of drug at the cellular level by describing their interactions with target proteins</p> <p>2. Explain the receptor signal transduction processes.</p> <p>3. Explain the molecular pathways affected</p>

				<p>by drugs.</p> <ol style="list-style-type: none"> 4. Understanding the applicability of molecular pharmacology and biomarkers in drug discovery process. 5. Outline the molecular features that are responsible for agonist and antagonist binding, and coupling to effector processes, with reference to the nicotinic, muscarinic, and β-adrenergic receptors
9.	MPH 202 A	Methods in Drug Evaluation	2017	<ol style="list-style-type: none"> 1. Know the commonly used instruments in experimental pharmacology. 2. describe the animal physiology with their biochemical reference values in various animal species. 3. Study of methods for collection of blood, body fluids and urine from experimental animals. 4. Record the effect of drug on Concentration Response Curves (CRC) using suitable isolated tissue preparations (Synergism and Antagonism).

10.	MPH 203	Practical 1	2017	<ol style="list-style-type: none"> 1. Calculation of the PA_2 Calculate the PA_2 Value 2. Interpolation bioassay 3. Matching or bracketing bioassay 4. Three point bioassay 5. Four point bioassay
11	MPH 204	Practical-II(BPK)	2017	<ol style="list-style-type: none"> 1. Compare and differentiate between compartmental and non compartmental analysis 2. Identify the physiological, Physicochemical and dosage form related factors that affects drug absorption from different dosage forms 3. Examine the absolute and relative bioavailability of drugs form different dosage forms using either plasma or urine data. 4. Compare the bioequivalence of two drug products
12	MPH 205	BIO-PHARMACEUTICS&	2017	<ol style="list-style-type: none"> 1. Understand the concept of ADME of drug in human body.

		PHARMACOKINETICS		<ol style="list-style-type: none"> 2. Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug 3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule
13	MPH 206	Human Values and Professional Ethics-II	2017	<ol style="list-style-type: none"> 1. Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field 2. Learn about morals, values & work ethics. 3. Develop commitment 4. Learn about the different professional roles. 5. Ethical, social and environmental awareness 6. Professional rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct
14	MPH 207	Comprehensive Viva	2017	
15	MPH 301	Mid-Term Evaluation of Research project	2017	<ol style="list-style-type: none"> 6. Final Year Projects represent the culmination of study towards the Master of

				<p>Pharmaceutical sciences degree.</p> <p>7. Projects offer the opportunity to apply and extend material learned throughout the program.</p> <p>8. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken.</p> <p>9. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups.</p> <p>10. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.</p>
16	MPH 401	Project thesis submission & presentation and Project Viva voce	2017	<p>1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree.</p> <p>2. Projects offer the opportunity to apply and extend material learned throughout the program.</p>

				<p>3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken.</p> <p>4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups.</p> <p>5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.</p>
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M. Pharmacy (Pharmaceutics)

S.No.	Course Code	Title of the Course	Years of Introduction	Course Outcomes
1	MPH 101B	ADVANCED PHARMACEUTICAL TECHNOLOGY	2017	1. Course designed to impart advanced knowledge and skills required to learn various aspects and concepts at

				<p>pharmaceutical industries.</p> <ol style="list-style-type: none"> 2. The Active Pharmaceutical Ingredients and Generic drug Product 3. The elements of Preformulation studies, Objectives Upon completion of the course, student shall be able to understand Optimization Techniques. 4. Industrial Management and GMP Considerations, development & Stability Testing, sterilization process, Pilot Plant Scale Up Techniques & packaging of dosage forms
2	MPH 102B(Pharmaceutics)	Advanced Pharmaceutics	2017	<ol style="list-style-type: none"> 1. Upon completion of this program the student will have fundamental knowledge in preparing conventional dosage forms, pharmaceutical calculation involved in formulation and appreciate the importance of good formulation for effectiveness. 2. The need, concept, design and evaluation of various customized, sustained and controlled release dosage

				<p>forms using solubility studies and basic theories of dissolution.</p> <p>3. To formulate and evaluate various novel drug delivery systems based on the molecular weight determination of polymers and its stability studies.</p>
3	MPH 103	Practical-I(PHARMACEUTICS)	2017	<p>1. The passage of drugs, biopharmaceutical parameters.</p> <p>2. How to do dissolution studies for the dosage forms to know the bioavailability of the drugs.</p> <p>3. Solubility studies for the drugs based on its pH and its applications in the formulations of drug delivery systems.</p> <p>4. To determine the molecular weight of the polymers.</p> <p>5. Gives an fundamental knowledge on the stability studies</p>
4	MPH 104	Practical-II(MAT)	2017	<p>5. Explains the importance of modern instrumentation in pharmaceutical analysis</p> <p>6. Describes the fundamental principles</p>

				<p>and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR.</p> <p>7. Discusses the principle and applications of chromatographic techniques</p> <p>8. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage form</p>
5	MPH 105	Modern Analytical Techniques and biostatics Theory	2017	<p>5. Explains the importance of modern instrumentation in pharmaceutical analysis</p> <p>6. Describes the fundamental principles and applications of spectroscopic techniques Viz., UV- Visible, IR, FTIR.</p> <p>7. Discusses the principle and applications of chromatographic techniques</p> <p>8. Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms.</p> <p>9. Explains the concepts of Statistics and their applications in pharmacy</p>

6.	MPH 106	Human Values and Professional Ethics-I	2017	<p>6. Awareness of ethical issues and basic ethical approaches.</p> <p>7. Improved writing skills and understanding of ethical conflict.</p> <p>8. Enables students to develop ability for moral reasoning and act with ethical deliberations.</p> <p>9. After studying ethics one is equipped with the ethical sensitivity and moral understanding required to solve complex ethical dilemmas.</p> <p>10. Learn how to live peacefully</p>
7.	MPH 107	Comprehensive Viva	2017	
8.	MPH 201B (Pharmaceutics)	INDUSTRIAL PHARMACY	2017	<p>1. The elements of preformulation studies.</p> <p>2. Acquire skill in preparation of different types of tablets.</p> <p>3. Acquire knowledge for evaluation of various dosage forms.</p> <p>4. Acquire the knowledge of processing of dosage form on large scale that suit pharma industry</p>
9.	MPH202B(Pharmaceutics)	PROCESS VALIDATION &	2017	<p>1. Acquire knowledge on various quality</p>

		CGMP		<p>assurance systems, processes and current regulatory guidelines related to manufacturing and distribution.</p> <p>2. Address quality issues and provide solutions needed to attain Quality leadership in an environment of continual improvement.</p> <p>3. Understand the importance of effective documentation.</p> <p>4. To prepare professionally competent individuals with Quality concept being engrained to achieve global quality standards in pharmaceutical industries</p>
10.	MPH 203	Practical-I	2017	<p>1. Gain knowledge and acquire skills to prepare different types of tablets.</p> <p>2. Highlights the handling of different equipment's for the preparation and evaluation of various dosage forms</p>
11	MPH 204	Practical-II(BPT)	2017	<p>5. Compare and differentiate between compartmental and non compartmental analysis</p> <p>6. Identify the physiological,</p>

				<p>Physicochemical and dosage form related factors that affects drug absorption from different dosage forms</p> <p>7. Examine the absolute and relative bioavailability of drugs form different dosage forms using either plasma or urine data.</p> <p>8. Compare the bioequivalence of two drug prodcts</p>
12	MPH 205	BIO-PHARMACEUTICS& PHARMACOKINETICS	2017	<p>1. Understand the concept of ADME of drug in human body.</p> <p>2. Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug</p> <p>3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule</p>
13	MPH 206	Human Values and Professional Ethics-II	2017	<p>7. Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field</p> <p>8. Learn about morals, values & work ethics.</p>

				<p>9. Develop commitment</p> <p>10. Learn about the different professional roles.</p> <p>11. Ethical, social and environmental awareness</p> <p>12. Professional rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct</p>
14	MPH 207	Comprehensive Viva	2017	
15	MPH 301	Mid-Term Evaluation of Research project	2017	<p>1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree.</p> <p>2. Projects offer the opportunity to apply and extend material learned throughout the program.</p> <p>3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken.</p> <p>4. In contrast to the majority of courses studied elsewhere in the program,</p>

				<p>projects are undertaken individually or in small groups.</p> <p>5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.</p>
16	MPH 401	Project thesis submission & presentation and Project Viva voce	2017	<ol style="list-style-type: none"> 1. Final Year Projects represent the culmination of study towards the Master of Pharmaceutical sciences degree. 2. Projects offer the opportunity to apply and extend material learned throughout the program. 3. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. 4. In contrast to the majority of courses studied elsewhere in the program, projects are undertaken individually or in small groups.

				5. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester.
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SVU College of Engineering

43. M.tech CHEMICAL ENGINEERING:

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1.	MACHT01	PROBABILITY & STATISTICS FOR CHEMICAL ENGINEERING		<p>To make use of the concepts of probability and their applications. Discrete and continuous expectations, Baye's theorem.</p> <p>2.To discuss Distributions and Properties and applications.</p> <p>3. To have Probability distribution of functions of random variables, sampling distribution, Bayesians estimation.</p> <p>4. Design the components of a classical hypothesis test. Infer the statistical inferential methods based on small and large sampling tests. Interpret the association of characteristics and through correlation and regression tools.</p>

				5.To acquire knowledge of Analysis of variance
2.	CHCHT 01	ADVANCE D TRANSP ORT PHENOME NA		<p>Have the knowledge on Shell momentum,energy ,mass balances and boundary conditions.</p> <p>Equations of Change for Isothermal Systems.</p> <p>2. Able to Solve continuity, Velocity Distributions with more than one Independent Variable.</p> <p>Macroscopic Balances for Isothermal Systems.</p> <p>3. Educate about Equations of Change for Non-Isothermal .Systems, Temperature Distributions in Turbulent Flow</p> <p>4. Macroscopic Balances For Non-Isothermal Systems, Equation of change for multi component systems.</p> <p>5. Inter phase Transport in Multi-Component Systems, Concentration Distributions in Turbulent Flow</p>
3.	CHCHT 02	PROCESS PLANT SIMULATI ON		<p>Knowledge on Modeling Aspects and Classification of Mathematical Modeling.</p> <p>2. Knowledge on models of mass and heat transfer for steady and unsteady state conditions.</p> <p>3. Models from fluid flow and Models from Reaction Engineering .</p> <p>4. Knowledge on Error Propagation & Data Regression.</p> <p>5. Knowledge Tearing Algorithms, Algorithms based on signal flow graph and reduced digraph, Newton's , direct substitution , Wegstein's method, dominant</p>

				Eigen value methods
4.	CHCHT 03	SEPARATION PROCESSES		<p>Applies the concepts of diffusion mass transfer, mass transfer coefficients, convective mass transfer, inter-phase mass transfer, equipment for gas-liquid operations</p> <p>2) Suggest and design equipment for various mass transfer operations</p> <p>3) Study of the stage wise mass transfer operations, principles of various stage wise contact processes like distillation</p> <p>4) Student will be able to select a separation process for a particular system.</p> <p>5) Able to understand the energy requirements of separation processes</p>
5.	CHCHE 11	POLLUTION CONTROL SYSTEMS		<p>Acquired knowledge on creative aspects of types of pollution and its control .</p> <p>2. Have the knowledge on removal of BOD and Chromium.</p> <p>3. Have the knowledge on removal of urea,treatments of phenolic effluents.</p> <p>4. Methods of Sulphur Dioxide Control — Process Changes , Removal of Oxides of Nitrogen</p> <p>5. Pollution control in Chemical Industries and Miscellaneous Process Industries.</p>
6.	CHCHT 04	OPTIMIZATION THEORY AND PRACTICE		<p>formulate and analyse the optimization of the given physical situation.</p> <p>2) Apply different methods of optimization and to suggest a technique for specific problem</p> <p>3) Understand the difference between constrained and unconstrained optimization</p> <p>4) Understand the importance of linear programming problems</p> <p>5) Realize the importance of optimization by understanding different examples</p>
7.	CHCHT 05	Chemical Reactor		<p>learn the importance of RTD and Non-ideal flow in reacting vessels.</p> <p>2) Calculate the conversions based on segregated flow model, dispersion model and</p>

		Theory		<p>tanks- in-series models.</p> <p>3) Understand the diffusion and reaction in a porous catalyst.</p> <p>4) Learn the factors influencing catalyst decay, the role of pore diffusion on catalyst activity rate.</p> <p>5) Understand the design of heterogeneous catalytic reactors</p>
8.	CHCHT 06	ADVANCED CONTROL SYSTEMS		<p>Acquired knowledge on creative aspects of Feed forward controller design based on steady state and dynamic models, tuning and configuration.</p> <p>2. Have the knowledge in developing a conceptual Control of Multi Input, Multi-Output Systems.</p> <p>3. Knowledge on Digital control systems in process control, Sampling and signal reconstruction</p> <p>Able to have knowledge on Development of Discrete Time Models, Response of Discrete –Time Systems.</p> <p>Analysis of Sampled – Data Control Systems.</p>
9.	CHCHT 07	PROCESS SYNTHESIS AND ANALYSIS		<p>Acquired knowledge on creative aspects of process design and a hierarchical approach to conceptual design. Able to estimate capital, operating cost, total capital investment and total product cost.</p> <p>2. Have the knowledge in developing a conceptual design of batch and continuous</p>

				<p>processes.</p> <p>3. Cost diagrams and the quick screening of process alternatives.</p> <p>4. Able to design minimum energy requirement for cooling and heating in heat exchanger networks.</p> <p>5. Cost Diagrams and Quick Screening of Process Alternatives</p>
10.	CHCHE 20	BIOPROCESS ENGINEERING		<p>1) Know the mechanisms of Engineering Approach to Biosynthesis.</p> <p>2) Understand Radiation & Chemical Sterilization - Batch Thermal Sterilization – Continuous Thermal Sterilization.</p> <p>3) Stoichiometry of Microbial Growth and Product Formation</p> <p>4) Operating Considerations for Bioreactors , Bioreactor Considerations in Immobilized Cell Systems .</p> <p>5) Recovery and Purification of Products, Traditional Industrial Bioprocess</p>
11.	CHCHE 19	ENZYME SCIENCE & ENGINEERING		<p>Know the mechanisms of Chemical and Enzyme Catalysts</p> <p>Formulate and Analyze Immobilized Enzyme Kinetics</p> <p>Design and analyze Enzyme Reactors</p> <p>Gain knowledge on Applications of Enzyme and on Biosensors</p>
12.	CHCHE 13	Polymer	2017	Acquired knowledge on Classification of Polymers and its

		science		<p>Structure,its degradation.</p> <ol style="list-style-type: none"> 2. Have the knowledge on Polymer Synthesis. 3. Have the knowledge on Polymer Confirmation and Chain Dimensions – Thermodynamics of Polymer Solutions 4. Knowledge on Viscoelasticity and Rubber Plasticity 5. Solid State Properties, Polymer Blends and Interpenetrating Networks
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43.B. tech Civil Engineering

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1.	MAT01	Engineering Mathematics – I	2017	<p>Extends an ability to analyze differential equations and solve them</p> <ol style="list-style-type: none"> 2. The students become familiar with the applications of differential equations to engineering problems. 3. In Mathematics, a transform is usually a device that converts one type into another type presumably easier to solve. 4. Use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients. 5. Solve an initial value problem for an nth order ordinary differential equation using the

				<p>Laplace transform.</p> <p>6. Expand functions as power series using Maclaurin's and Talor's series</p> <p>7. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it.</p> <p>8. Curve tracing is an analytical method of drawing an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc it is useful in applications of finding length, area, volume.</p> <p>9. Multiple integral is a natural extension of a definite integral to a function of two, three variables and are useful in evaluating area and volume of any region bounded by the given curves.</p>
2.	CST01	Computer Programming	2017	<p>Able to design the flowchart and algorithm for real world problems</p> <p>2. Able to learn and understand new programming languages</p> <p>3. Able to construct modular and readable programs</p> <p>4. Able to write C and C++ programs for real world problems using simple and compound data types</p> <p>5. Adapt programming experience and language knowledge to other programming language contexts</p> <p>6. Good programming style, standards and practices during program development</p>
3.	CET01	Environmental Studies	2017	<p>. Acquire knowledge in</p> <p>Diverse components of environment and natural resources</p>

				<p>Ecosystem and biodiversity & its conservation methods</p> <p>Population growth and human health</p> <p>Green technology</p> <p>2. Identify and resolve the issues related to sources of different types of pollutions</p> <p>3. Provide solutions to individuals, industries and government for sustainable development of natural resources</p> <p>4. Apply environmental ethics in protection of diversified ecosystems.</p>
4.	PHT01	Engineering Physics	2017	<p>Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.</p> <p>2. Ability to understand the crystal geometries and estimation of crystal structure by X-ray diffraction techniques.</p> <p>3. Students demonstrate the ability to identify and apply appropriate analytical and mathematical tools of physics in solving engineering problems.</p> <p>4. Students demonstrate the ability to apply knowledge of band theory in the area of electronics and understanding the basic electron transportation phenomenon in micro devices.</p> <p>5. Student's ability to understand the principles in the production and applications of lasers and their effective utilization in optical communication</p>

				<p>and detection.</p> <p>6. Students demonstrate the ability to understand size depended properties of nano dimensional materials and their effective utilization in making nano and micro devices for further microminiaturization of electronic devices.</p>
5.	CYT01	Engineering Chemistry	2017	<p>To understand the importance of the water and its quality</p> <p>2. To identify uses of electrochemical processes in nature and industry</p> <p>3. To understand properties of good fuel for reducing auto exhaust gases to the environment</p> <p>4. To understand synthesis, properties and engineering applications of polymers</p> <p>5. To know the procedure and analysis of cementing materials</p>
6.	MET01	Engineering Graphics	2017	<p>Make a distinction between first angle projection and third angle projection of drawing.</p> <p>2. Draw hyperbola, parabola, Involutives and Cycloidal curves.</p> <p>3. Draw sections of solids including cylinders, cones, prisms and pyramids.</p> <p>4. Draw projections of lines, planes, solids and sections of solids.</p> <p>5. Draw orthographic projections of lines, planes, and solids</p>
7.	CSP01	Computer Programming Lab	2017	<p>Able to have fundamental concept.</p> <p>2. Able to write, compile and debug programs in C language.</p> <p>3. Able to formulate problems and implement algorithms in C.</p> <p>4. Able to effectively choose programming components that efficiently solve</p>

				<p>computing problems in real-world.</p> <p>5. Able to use different data types in a computer program.</p> <p>6. Able to design programs involving decision structures, loops and functions</p>
8.	MEP01	Workshop Practice	2017	<p>Prepare different types of joints by means of wood, i.e., wood working.</p> <p>2. Prepare sand moulds by means of wooden patterns.</p> <p>3. Identify different and prominent tools used in various sections of workshop.</p> <p>4. Make a distinction between Lap, Butt and T – joints in welding processes.</p> <p>5. Perform markings, cutting, and filing on steel specimens by fitting tools</p>
9.	MAT02	Engineering Mathematics – II	2017	<p>Use ranks of matrices to decide whether the system of linear equations is consistent or not and hence solve.</p> <p>2. Use Cayley-Hamilton theorem to find inverses or powers of matrices.</p> <p>3. Use Eigen values and vectors to reduce Quadratic forms to normal form.</p> <p>4. Ability to analyze motion problems from real lines to curves and surfaces in 3-D. Use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. To use Green’s theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. To use Stokes’ theorem to give a physical interpretation of the curl of a vector field</p> <p>7. To use the divergence theorem to give a physical interpretation of the divergence of a vector field.</p>

				<p>8. Find the Fourier series representation of a function of one variable. It is representation of a function as a series of constants times sine and cosine functions of different frequencies in order to see periodic phenomenon have long fascinating mankind.</p> <p>9. Evaluation of certain improper integrals is made simple with introduction of Gamma and Beta functions</p> <p>10. Primary motivation for studying certain special functions is that they arise in solving certain ordinary differential equations that model many physical phenomenon. They constitute necessary items in the toolkit of anyone who wishes to understand the work with such models.</p>
10.	CST02	Data Structures	2017	<p>A knowledge of various Methods and Notations for comparing the performance of various Data Structures.</p> <p>2. A knowledge of development of linear data structures like stacks, Queues and their operations, Implementation using Arrays and Linked Lists.</p> <p>3. A knowledge of properties of Binary Search Trees and balanced binary search trees.</p> <p>4. A knowledge of properties of Splay Trees, Red Black Trees, AVL Trees and their implementation</p> <p>5. A knowledge of efficient external searching techniques using Indexing, Hashing.</p>
11.	EET01	Basic Electrical	2017	Understand and apply principles of basic electrical circuits b. Analyse and

		Engineering		<p>apply theorems for different types of networks</p> <p>c. Understand the principle of operation of DC machines, Transformers and Induction motors</p> <p>d. Compute the performance of DC motor, Single phase Transformer</p> <p>e. Carryout calculations related to design of illumination schemes</p>
12.	ECT01	Basic Electronics Engineering	2017	<p>Understands different types of Electronic Devices and working mechanism.</p> <p>2. Have knowledge of amplifiers and oscillators used in day-to-day life.</p> <p>3. Understands digital circuits used in computer systems and other systems.</p> <p>4. Will have knowledge of measurements and measuring instruments.</p> <p>5. Understands the principles of communication systems used in day-to-day life</p>
13.	CET 03	BUILDING MATERIALS AND CONSTRUCTION TECHNOLOGY	2017	<p>To find the suitability various building materials at a particular location in the building construction.</p> <p>To know the preparation of concrete and tests to be performed</p> <p>Ability to utilize various modern building materials like timber products, protective coatings, and fibre textiles</p> <p>Able to know the different types of concretes their application, mix design and tests.</p> <p>To develop acquaintance over service requirements like protectives, damp and termite proofing.</p>

				Able to repair and rehabilitation of distressed structures and use of construction equipment in the field
14.	ENT01	English	2017	<p>Student will be able to get a thorough knowledge of various topics of grammar of English language.</p> <p>2. Student will be trained in close reading of language and its relation to literary form.</p> <p>3. Student will be able to read English correctly with focus on fluency and pronunciation.</p> <p>4. Student will be able to understand the use of English through computer software.</p> <p>5. Student will be in a position to face computer based competition exams like TOEFL.</p> <p>6. They will get an ability to communicate effectively and to write accurately using English language.</p>
15.	CSP02	Data Structures Lab	2017	<p>Understand algorithmic thinking and apply it to programming.</p> <p>2. Be able to design and analyze the time and space efficiency of the data structure.</p> <p>3. Be capable to identify the appropriate data structure for given problem.</p> <p>4. Have practical knowledge on the application of data structures</p>
16.	ENP01	English Communication Lab	2017	<p>Students gain felicity in using language software.</p> <p>2. They are exposed to different accents of the language.</p>
17.	MAT 03	ENGINEERING	2017	Differentiate and integrate functions of a complex variable, including the

		MATHEMATICS – III		evaluation of contour integrals using the Residue Theorem and the evaluation of some real integrals using contour integration.
18.	MET02	BASIC MECHANICAL ENGINEERING	2017	Understand basics of thermodynamics and components of thermal plant 2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice. 3. Understand basics of heat transfer, refrigeration and internal combustion engines. 4. Understand mechanism of power transfer through belt, chain, rope and gear drives. 5. Understand functions and operations of machine tools including milling, grinding, and shaping machines
19.	CET 04	ENGINEERING MECHANICS	2017	To acquire the basic knowledge of the analysis of general structures when external loads are applied
20.	CET 05	ENGINEERING GEOLOGY	2017	To apply the geological knowledge to Civil Engineering Constructions, at different stages. The kind of study exposes the geological drawbacks, if any. 2. To help the site engineers to take suitable precautionary measures to overcome the drawbacks but also to take advantage of the site geology findings wherever possible. 3. To take precautionary measures in civil engineering constructions based on geological parameters.
21.	CET 06	FLUID MECHANICS AND HYDRAULIC	2017	To solve fluid flow problems using fundamental principles 2. To measure pressure, velocity and discharge

		MACHINES		<p>3. To perform model analysis</p> <p>4. To analyze and solve pipe flow problems</p> <p>5. To design submerged bodies based on drag and lift characteristics</p> <p>6. To select suitable pumps and turbines based on the requirements</p>
22.	CET 07	SURVEYING	2017	<p>Measure and layout elevations and relative position of points, understand plans and field notes. Perform computations using information gathered from differential levelling, traversing, calculations, and volume/ earthwork.</p> <p>Ability to design and set out curves</p> <p>Ability to use modern surveying equipment</p>
23.	CEP 01	SURVEYING LABORATORY	2017	<p>Ability to use the techniques, skill and surveying equipment for engineering practice.</p> <p>2. Applying mathematics concepts in the field of surveying.</p> <p>3. Develop an understanding of modern surveying equipment</p>
24.	CEP 02	ENGINEERING GEOLOGY LABORATORY	2017	<p>The study and identification of minerals, rocks and structures with their utilization in civil engineering works.</p>
25.	CET 08	MECHANICS OF SOLIDS	2017	<p>Ability to analyze the stress state of members in tension, Shear torsion and bending.</p> <p>2). Ability to construct the SFD, BMD, TMD Diagrams and to draw their stress diagrams</p>
26.	CET 09	APPLIED	2017	<p>To design channel transitions and hydraulics jump stilling basins</p>

		HYDRAULICS		<p>To study the effects of hydraulic structures on flow</p> <p>To design irrigation canals, storm water drains, sewers etc</p>
27.	CET 10	SOIL MECHANICS	2017	<p>Classify the soils based on their properties</p> <p>Assess the permeability and seepage characteristics of soil.</p> <p>Find out the settlement of soil based on the stress distribution.</p> <p>Assess the shear strength of various types of soil.</p> <p>Analyze the stability of slopes using different methods.</p>
28.	CET 11	STRUCTURAL ANALYSIS – I	2017	<p>Ability to apply knowledge of general structures in practice.</p> <p>2. Ability to analyze statically determinate trusses, beams, frames.</p> <p>3. Familiarity with professional and ethical issues and the importance of lifelong learning in structural Engineering</p>
29.	CET 12	ENVIRONMENTAL ENGINEERING – I	2017	<p>Able to estimate the water demand of any area</p> <p>Able to design the distribution network system</p> <p>Able to avoid the sources of water pollution</p> <p>Able to design water treatment facility</p> <p>Able to apply advanced technologies or principles to control air pollution</p>
30.	CET 13	BUILDING PLANNING DESIGN AND DRAWING	2017	<p>The scope of this course is to introduce the concepts of building planning and drawing with emphasis on architectural planning.</p> <p>This subject is designed as an introduction for students who wish to develop their competence and skills in the preparation of architectural and building drawings.</p>

31.	CEP 03	FLUID MECHANICS & HYDRAULICS MACHINERY LABORATORY	2017	<p>To calibrate the flow measuring devices</p> <p>To calculate loss coefficients for use in the pipe-flow analysis</p> <p>To prepare the characteristic curves of the pumps and turbines</p>
32.	CEP 04	MATERIAL TESTING LABORATORY	2017	<p>To acquire the knowledge and behavior in finding the properties of different materials</p>
33.	CET 14	HYDROLOGY	2017	<p>To develop IDF and DAD curves for use in the flood estimation</p> <p style="padding-left: 40px;">To estimate the design flood for use in the design of hydraulic structures</p> <p style="padding-left: 40px;">To perform flood routing for reservoir operation and stream flow control</p> <p style="padding-left: 40px;">To arrive at groundwater yield of open and tube wells</p>
34.	CET 15	FOUNDATION ENGINEERING – I	2017	<p>Describe different soil exploration techniques.</p> <p style="padding-left: 40px;">Gain knowledge on the factors affecting bearing capacity of shallow foundation, various tests to find the bearing capacity and the components of settlement of foundation.</p> <p style="padding-left: 40px;">Know the contact pressure distribution below footings and rafts, types and proportioning of isolated and combined footings and mat foundation.</p> <p style="padding-left: 40px;">Describe the types of piles, their functions, factors influencing the selection of pile, load carrying capacity of pile and pile group and the settlement of pile groups.</p>

				Calculate the plastic equilibrium in soils, earth pressure on retaining walls and the pressure on the wall due to line loads.
35.	CET 16	DESIGN OF R.C.C. STRUCTURES	2017	To be in a position to design the basic elements of reinforced concrete structures. Such as slab, beam, column and footing which form part of any structural system with reference to Indian standard code of practice for reinforced Concrete Structures and Design
36.	CET 17- E 5	WATER POWER ENGINEERING	2017	Students able to plan and design a power house in surface and subsurface
37.	CET 18	DESIGN OF STEEL STRUCTURES	2017	Ability to design, tension members, compression members and ability to analyze and design of simple bolted and welded connections. Ability to design steel framing system and connections of a building in a team setting. Familiarity with professional and ethical issues and the importance of lifelong learning in structural Engineering
38.	CET 19	STRUCTURAL ANALYSES – II	2017	Ability to solve statically indeterminate structures using matrix (Stiffness & flexibility) methods. Ability to analysis framed structures by using appropriate methods and exact methods
39.	CEP 05	GEOTECHNICAL ENGINEERING LABORATORY	2017	Acquire the capacity to test the soil and assess its Engineering and Index properties 2. Apply the same to the engineering problems

40.	CEP 06	ENVIRONMENTAL ENGINEERING LABORATORY	2017	Able to Perform common environmental experiments relating to water quality Able to Statistically analyze and interpret laboratory results Demonstrate good written and oral communication skills Able to Perform common environmental experiments relating to water and waste water quality Able to Statistically analyze and interpret laboratory results Able to Demonstrate good written and oral communication skills
41.	CEP 07	SURVEY CAMP	2017	After completion of the course the student will have: Apply various surveying principle in solving engineering survey using the survey problems Display team work and leadership capabilities
42.	CET 20	TRANSPORTATION ENGINEERING	2017	Estimate the requirements and design highway pavements. 2. Apprehend different components of Railways, Airports and Harbours
43.	CET 21	ENVIRONMENTAL ENGINEERING - II	2017	Able to estimate the quantity of waste water generation from any area. 2. Able to understand the impacts of mismanagement of waste water. 3. Able to apply advanced concepts in the design of waste water treatment plant. 4. Successfully apply advanced concepts of water and environmental engineering to design, analyze, and develop technologies, processes or systems to meet desired needs of society both, professionally and ethically
44.	CET 22	GREEN	2017	Able to appreciate and explain the different types of environmental pollution

	OE-01	TECHNOLOGY		<p>problems and their sustainable solutions</p> <p>Having a broader perspective in thinking for energy efficient practices by utilizing the engineering knowledge and principles gained from this course</p>
45.	CET 23	QUANTITY SURVEYING AND VALUATION	2017	<p>To know about the approximate or detailed estimation of simple buildings</p> <p>To be through in standard specifications in building construction</p> <p>To work on rate analysis of earth work for foundations and basement of buildings</p> <p>To be able to value a building</p>
46.	CET 24	FOUNDATION ENGINEERING - II	2017	<p>After completion of the course the student will be able to:</p> <p>Learn and able to find out the Soil Profile in a given location.</p> <p>Select suitable foundation for a given structure and site.</p> <p>Expertise in the calculation of load carrying capacity of selected foundation</p> <p>Gain experience in solving field geotechnical engineering problems such as slope stability and earth retaining structures.</p>
47.	EOT 01	MANAGERIAL ECONOMICS	2017	<p>Estimation of cost production and supply analysis.</p> <p>Able to do Profit management with respect to good</p>
48.	COT 01	MANAGEMENT ACCOUNTING	2017	<p>Students are able to prepare a balance sheet Budgeting</p> <p>Optimization of cost benefit analysis</p>
49.	CEP 08	TRANSPORTATION ENGINEERING LAB	2017	<p>Able to perform various tests for selection of various materials used in highway construction</p>
50.	CEP 09	TECHNICAL	2017	<p>An understanding of professional and ethical responsibility.</p>

		SEMINAR & PRESENTATION SKILLS		<p>Recognition of the need for, and an ability to engage in life-long learning.</p> <p>Knowledge of contemporary issues.</p> <p>An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.</p>
51.	CET 25	REMOTE SENSING & GIS	2017	<p>Be able to manage, manipulate and analyze spatial data using GIS technology</p> <p>To produce a student who can contribute effectively to the use of image analysis and GIS techniques.</p> <p>Knowledge of remote sensing sensors & platforms their properties</p>
52.	CET 26	STRUCTURAL DYNAMICS AND DESIGN OF EARTHQUAKE RESISTANT STRUCTURES	2017	<p>Able to find the response of the structures subjected to dynamic loads.</p> <p>2. Abilities to analysis and design of Earthquake resisting Structures</p>
53.	CET 27	IRRIGATION & HYDRAULIC STRUCTURES	2017	<p>To plan irrigation projects and management of irrigation water</p> <p>To design weirs, barrages and dams</p>
54.	CET28-E5	PLANNING AND DEVELOPMENT OF WATER RESOURCES PROJECTS	2017	<p>Able to design an optimum water resources project by considering aspects of cost-benefit analysis.</p> <p>Able to apply the knowledge of flood control and river basin planning.</p> <p>Application of the functions and rights related to water law</p>

55.	CET 29	PROFESSIONAL ETHICS	2017	Ability to apply ethics while decision making during their profession. 2. Enable to feel their responsibility and rights delivering the goods during their profession.
56.	MAT 04	NUMERICAL METHODS	2017	. Develop analytical skills for the problems involving differential equations 2. Develop skills in analyzing linear and non-linear algebraic equations 3. Develop skills in the design of mathematical equations and arrive at numerical solutions involving integrations and differential equations
57.	CEP 10	CONCRETE TECHNOLOGY LABORATORY	2017	Able to fine the quality of materials used in concrete and the properties of hardened concrete
58.	CEP 11	CAD LABORATORY	2017	Ability to apply computer aided design techniques to complete all phases to top-down civil engineering design problems. 2. Use computer aided software techniques to prepare and deliver written and drawing presentation of design specifications 3. Understanding to interpret the detailing drawing of components with relevant IS codes.
59.	CEP 12	PROJECT WORK	2017	To enable the students to work in convenient group 2. Capable of doing a project involving theoretical and experimental studies. 3. Modern trend and technology in civil engineering
60.	CET 31	CONSTRUCTION PLANNING &	2017	Compute and sketch CPM and PERT diagram. 2. Assemble and sketch scheduling of construction activities in construction

		PROJECT MANAGEMENT		industry
61.	CEP 14	GIS LAB	2017	Ability to handle spatial data in GIS environment Analysis and data management of spatial data for solution of engineering projects

CIVIL M.TECH SE SYLLABUS

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
	CEMAC501	ADVANCED ENGINEERING MATHEMATICS	2017	<p>This part extends our ability to analyze Partial differential equations.</p> <p>2. The students become familiar with the special functions of differential equations to engineering problems.</p> <p>3. The student becomes conversant with the fundamentals of Statistics.</p> <p>4. The student becomes familiar with the Complex numbers and elementary functions of complex variable and is able to understand the basics of Laplace transforms and their applications.</p> <p>5. The student gets familiarity in using mathematical tools such as directional derivatives and divergence play significant roles in many applications.</p>
	CESEC 502	THEORY OF ELASTICITY	2017	<p>Applying the concepts of various stresses, strains and torsion in problems related to elasticity.</p> <p>2. Applying the principles of theory of elasticity in designing the beams, curved sections etc.,</p>

	CESEC 503	MATRIX METHODS OF STRUCTURAL ANALYSIS	2017	Distinguish determinate and indeterminate structures. 2. Identify the method of analysis for indeterminate structures 3. Apply matrix methods of analysis for continuous beams 4. Apply matrix methods of analysis for rigid and pin jointed frames.
	CESEC 504	ADVANCED PRE-STRESSED CONCRETE	2017	Learns to design and conduct experiments to get high strength concrete
	CESEP 507	ADVANCED STRUCTURAL ENGINEERING (PRACTICAL)	2017	Assess the workability of cement concrete and its suitability, quality of concrete 2. Assess the quality of fine and coarse aggregates after testing the aggregates according to IS specifications. 3. Test the quality of cement concrete by conducting compressive strength on concrete cubes. 4. Design different grades of mix design
	CESEC 601	FINITE ELEMENT STRUCTURAL ANALYSIS	2017	Analyse and build FEA models for various Engineering problems. 2. Able to identify information requirements and sources for analysis , design and evaluation 3. Use professional-level finite element software to solve engineering problems.

				4. Interpret results obtained from FEA software solutions, not only in terms of conclusions but also awareness of limitations
	CESEC 602	THEORY OF PLATES	2017	<p>Assess the strength of plate panels under point, linearly varying and uniformly distributed loads</p> <p>2. Analyze plates under different boundary conditions by various classical methods and approximated methods</p> <p>3. Be Familiar with classification of shells and classical shell theories and apply them in engineering design</p> <p>4. Expose to single curved shells, doubly curved shells and cylindrical shell</p>
	CESEC 603 :	STRUCTURAL DYNAMICS	2017	<p>To design the seismic forces of the structures as per the geographical conditions</p> <p>2. Write equation of motion for single and multi degree of freedom systems</p> <p>3. Understand the impact of damping on characteristics of vibrating system</p> <p>4. Gain Knowledge about arbitrary and pulse excitation</p> <p>5. Understand applications of Numerical methods in dynamics</p> <p>6. Analyse in various theories of failure and plasticity</p>
	CESEC 604	ADVANCED	2017	Able to calculate and analyse the crack widths

		STRUCTURAL CONCRETE DESIGN		2. Able to design the shear walls and ribbed floors
	CESEP 607)	COMPUTING TECHNIQUES (PRACTICAL	2017	Understand the software usages for structural members. 2. Able to analyse plane, space frames and dynamic response and natural frequency for beams and frames. 3. Able to design, detailing and estimations of RC members. 4. Able to design the steel members like truss, beams and columns.

CIVIL M.TECH SYLLABUS

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1.	CEMAC 501	ADVANCED ENGINEERING MATHEMATICS	2017	This part extends out ability to analyze Partial differential equations. 2. The students become familiar with the special functions of differential equations to engineering problems. 3. The student becomes conversant with the fundamentals of Statistics. 4. The student becomes familiar with the Complex numbers and elementary functions of complex variable and is able to understand the basics of Laplace transforms and their applications.

				5. The student gets familiarity in using mathematical tools such as directional derivatives and divergence play significant roles in many applications.
2.	CEGTC 502	BASIC GEOMECHANICS AND SOIL BEHAVIOUR	2017	Predict the expected soil conditions in given geologic settings. 2. Be able to determine material properties and predict soil behaviour. 3. Be able to estimate and understand the nature of subsurface stress. 4. Assessment of soil deformation parameters and settlement magnitude and rate of settlement. 5. Estimation of strength parameters of soil.
3.	CEGTC 503	SOIL DYNAMICS AND MACHINE FOUNDATION	2017	. Analyze the structures with single degree of freedom for dynamic loading conditions. 2. Find out the natural frequencies and the mode shapes of foundations under dynamic loading. 3. Gain knowledge on the design and perspectives Machine foundations and the codal provisions for their design.
4.	CEGTC 504	EXPERIMENTAL GEOMECHANICS	2017	Knowledge of site specific field investigations including collection of soil samples for testing and observation of soil behavior/Building damage. Be able to identify and classify soil based on standard geotechnical Engineering practice. Be able to perform field and laboratory tests for quality control
5.	CEGTE 505	MATRIX METHODS OF	2017	Distinguish determinate and indeterminate structures. Identify the method of analysis for indeterminate structures

		STRUCTURAL ANALYSIS		Apply matrix methods of analysis for continuous beams Apply matrix methods of analysis for rigid and pin jointed frames.
6.	CEGTE 506	THEORY OF ELASTICITY	2017	Applying the concepts of various stresses, strains and torsion in problems related to elasticity. 2. Applying the principles of theory of elasticity in designing the beams, curved sections etc.,
7.	CEGTP 507	GEOTECHNICAL ENGINEERING (PRACTICAL	2017	Students must be able to recognize ground behaviour and identify important geotechnical parameters in soil and rock exposures. Students must be able to map pertinent soil/rock features and Summarize geotechnical field data.
8.	CEGTC 601	ADVANCED FOUNDATION ENGINEERING	2017	A student learn and able to find out the Soil Profile in a given location. A student able to select suitable foundation for a given structure and site. Expertise in the calculation of load carrying capacity of selected foundation. Gain experience in solving field geotechnical engineering problems
9.	CEGTC 602	GROUND IMPROVEMENT TECHNIQUES	2017	Assess the geotechnical problems in various types of soils and suggest suitable ground improvement techniques. 2. Choose the suitable dewatering techniques for construction sites where the ground water table is at a higher level. 3. Identify the apt ground improvement technique for various types of soils and site conditions. 4. Apply the earth reinforcement techniques for retaining walls and slopes.

				5. Use the various types of grouting materials and techniques to strengthen the soil.
10	CEGTC 603	EARTH AND EARTH RETAINING STRUCTURES	2017	Develop an understanding of the fundamental concepts that governs the behaviour of Earth and Earth Retaining Structures. 2. Able provide designs of the Earth and Earth Retaining Structures in the field
11	CEGTC 604	NUMERICAL METHODS IN GEOTECHNICAL ENGINEERING	2017	1) Find out the roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations by direct and indirect methods. 2) Solve problems where huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values. 3) Use the numerical differentiation and integration when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information. 4) Solve engineering problems which are characterized in the form of nonlinear ordinary differential equations, since many physical laws are couched in terms of rate of change of one independent variable 5) Solve the initial and boundary value problems related heat flow, both one and two dimensional and vibration problems. Understands the numerical techniques of solving the partial differential equation in engineering applications

12	CEGTE 605	STRUCTURAL DYNAMICS	2017	<p>Analyze the dynamic response of single degree freedom system using fundamental theory and equation of motion.</p> <p>Analyze dynamic response of Multi-degree of freedom system with lumped parameters.</p> <p>Apply approximate methods to obtain fundamental natural frequency of structures.</p> <p>Analyze dynamics response of Multi degree of freedom system with distributed mass</p>
13	CEGTP 607	COMPUTING TECHNIQUES (PRACTICAL	2017	Able to develop and design the civil engineering structures
14	ELECTIVES 01	CRITICAL STATE SOIL MECHANICS	2017	Familiarize with the Development of constitutive laws for geotechnical materials including linear or nonlinear elastic (hyperbolic), linear elastic perfectly plastic, and non-linear elastic-plastic models based on the Critical State Soil Mechanics theory.
15	02	DEEP FOUNDATIONS	2017	<p>. The students will be able to:</p> <p>Get expertise in the methods of installation and calculation of load carrying capacity of different types of Piles.</p> <p>2.Gain experience in solving field geotechnical engineering problems with deep foundations such as Pile and Well foundationS</p>
16	03	EARTH AND ROCKFILL DAMS	2017	Develop an understanding of the fundamental concepts that governs the behaviour of

				Earth and Rockfill Dams Able provide designs of the Earth Rockfill Dams in the field
17	04	ENVIRONMENTAL GEOTECHNIQUES	2017	Able to analyze and design waste containment systems to preserve and conserve the environment
18	05	MARINE FOUNDATION	2017	Able to select suitable foundation for a given marine structure.. Know in the calculation of load carrying of selected foundation
19	06	PAVE WAY DESIGN	2017	Familiarize the student to learn wave and wave propagation and dynamic properties of soils Familiarize the student with the procedure used for machine foundation design. Familiarize the student about the vibration isolation and screening techniques.
20	07	ROCK MECHANICS	2017	An ability to apply knowledge of mathematics, science and engineering An ability to identify, formulate and solve engineering problems The broad education necessary to understand the impact of engineering solutions in a global and societal context A knowledge of contemporary issues An ability to use the techniques, skills and modern engineering tools necessary for engineering practice
21	08	STRUCTURAL ANALYSIS AND	2017	Able to select suitable foundation for a given structure and site. 2. Expertise in the calculation of load carrying capacity of selected foundation.

		DESIGN OF FOUNDATIONS		3. Gain experience in solving field geotechnical engineering problems involving Shallow and Deep Foundations
22	09	GEOSYNTHETICS IN CIVIL ENGINEERING	2017	Familiarize with functions of geosynthetics 2. Able to use appropriate geosynthetics for a particular application.
23	10	FOUNDATIONS ON EXPANSIVE SOILS	2017	Able to measure and estimate the swelling characteristics of expansive soils. 2. Can design the structures on expansive soils.

44. CSE B.TECH SYLLABUS

S. No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
	MAT01	Engineering Mathematics – I	2017	<ul style="list-style-type: none"> . Extends an ability to analyze differential equations and solve them 2. The students become familiar with the applications of differential equations to engineering problems. 3. In Mathematics, a transform is usually a device that converts one type into another type presumably easier to solve. 4. Use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients. 5. Solve an initial value problem for an nth order ordinary differential equation using the

				<p>Laplace transform.</p> <p>6. Expand functions as power series using Maclaurin's and Talor's series</p> <p>7. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it.</p> <p>8. Curve tracing is an analytical method of drawing an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc it is useful in applications of finding length, area, volume.</p> <p>9. Multiple integral is a natural extension of a definite integral to a function of two, three variables and are useful in evaluating area and volume of any region bounded by the given curves.:</p>
	CST01	Computer Programming	2017	<p>Able to design the flowchart and algorithm for real world problems</p> <p>2. Able to learn and understand new programming languages</p> <p>3. Able to construct modular and readable programs</p> <p>4. Able to write C and C++ programs for real world problems using simple and compound data types</p> <p>5. Adapt programming experience and language knowledge to other programming language contexts</p> <p>6. Good programming style, standards and practices during program development</p>
	CET01	Environmental Studies	2017	On successful completion of this course the students will be able to

				<ol style="list-style-type: none"> 1. Acquire knowledge in Diverse components of environment and natural resources Ecosystem and biodiversity & its conservation methods Population growth and human health Green technology 2. Identify and resolve the issues related to sources of different types of pollutions 3. Provide solutions to individuals, industries and government for sustainable development of natural resources 4. Apply environmental ethics in protection of diversified ecosystems
	CET02	Basic Civil Engineering	2017	<p>To find the suitability of various building materials at a particular location in the building construction.</p> <ol style="list-style-type: none"> 2. Take accurate measurements, field booking, plotting and adjustment of errors can be understood 3. Analyze the status of water quality standards for drinking and construction 4. Classify the roads and bridges
	MET02	Basic Mechanical Engineering	2017	<ol style="list-style-type: none"> 1. Understand basics of thermodynamics and components of thermal plant 2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice. 3. Understand basics of heat transfer, refrigeration and internal combustion engines. 4. Understand mechanism of power transfer through belt, chain, rope and gear drives. 5. Understand functions and operations of machine tools including milling, grinding, and

				shaping machine
	ENT01	English	2017	<p>Student will be able to get a thorough knowledge of various topics of grammar of English language.</p> <ol style="list-style-type: none"> 2. Student will be trained in close reading of language and its relation to literary form. 3. Student will be able to read English correctly with focus on fluency and pronunciation. 4. Student will be able to understand the use of English through computer software. 5. Student will be in a position to face computer based competition exams like TOEFL. 6. They will get an ability to communicate effectively and to write accurately using English language
	CSP01	Computer Programming Lab	2017	<ol style="list-style-type: none"> 1. Able to have fundamental concept. 2. Able to write, compile and debug programs in C language. 3. Able to formulate problems and implement algorithms in C. 4. Able to effectively choose programming components that efficiently solve computing problems in real-world. 5. Able to use different data types in a computer program. 6. Able to design programs involving decision structures, loops and functions.
	ENP01	English Communication Lab	2017	<p>Students gain felicity in using language software.</p> <ol style="list-style-type: none"> 2. They are exposed to different accents of the language.
	MAT02	Engineering Mathematics – II	2017	<p>Use ranks of matrices to decide whether the system of linear equations is consistent or not and hence solve.</p> <ol style="list-style-type: none"> 2. Use Cayley-Hamilton theorem to find inverses or powers of matrices.

				<p>3. Use Eigen values and vectors to reduce Quadratic forms to normal form.</p> <p>4. Ability to analyze motion problems from real lines to curves and surfaces in 3-D. Use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.</p> <p>5. To use Green's theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. To use Stokes' theorem to give a physical interpretation of the curl of a vector field</p> <p>7. To use the divergence theorem to give a physical interpretation of the divergence of a vector field.</p> <p>8. Find the Fourier series representation of a function of one variable. It is representation of a function as a series of constants times sine and cosine functions of different frequencies in order to see periodic phenomenon have long fascinating mankind.</p> <p>9. Evaluation of certain improper integrals is made simple with introduction of Gamma and Beta functions</p> <p>10. Primary motivation for studying certain special functions is that they arise in solving certain ordinary differential equations that model many physical phenomenon. They constitute necessary items in the toolkit of anyone who wishes to understand the work with such models.</p>
	CST02	Data Structures	2017	<p>A knowledge of various Methods and Notations for comparing the performance of various Data Structures.</p> <p>2. A knowledge of development of linear data structures like stacks, Queues and their</p>

				<p>operations, Implementation using Arrays and Linked Lists.</p> <p>3. A knowledge of properties of Binary Search Trees and balanced binary search trees.</p> <p>4. A knowledge of properties of Splay Trees, Red Black Trees, AVL Trees and their implementation.</p> <p>5. A knowledge of efficient external searching techniques using Indexing, Hashing.</p>
	PHT01	Engineering Physics	2017	<p>Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.</p> <p>2. Ability to understand the crystal geometries and estimation of crystal structure by X-ray diffraction techniques.</p> <p>3. Students demonstrate the ability to identify and apply appropriate analytical and mathematical tools of physics in solving engineering problems.</p> <p>4. Students demonstrate the ability to apply knowledge of band theory in the area of electronics and understanding the basic electron transportation phenomenon in micro devices.</p> <p>5. Student's ability to understand the principles in the production and applications of lasers and their effective utilization in optical communication and detection.</p> <p>6. Students demonstrate the ability to understand size depended properties of nano dimensional materials and their effective utilization in making nano and micro devices for further microminiaturization of electronic devices.</p>
	CYT01	Engineering Chemistry	2017	<p>To understand the importance of the water and its quality</p> <p>2. To identify uses of electrochemical processes in nature and industry</p> <p>3. To understand properties of good fuel for reducing auto exhaust gases to the environment</p> <p>4. To understand synthesis, properties and engineering applications of polymers</p>

				5. To know the procedure and analysis of cementing materials
	EET02	Circuit Theory	2017	<p>Match concepts in trigonometry, complex algebra, and matrix algebra to utilize techniques, skills, and modern engineering tools necessary for electrical engineering practices.</p> <p>Select proper network reduction techniques, circuit laws and theorems for magnetic / electric circuit solution considering economic, performance, efficiency and availability constraints.</p> <p>Estimate parameters for different types of attenuators and filters used in signal modulation for power systems and communication systems. Analyze circuits and systems by their standard parameters to identify their characteristics in general form, applicable for generation, transmission and distribution considering economical, ethical and practical limitation.</p> <p>Develop various methodology/strategies through various domain of analysis to evaluate performance characteristics of electrical networks and analyze their operation under different operating conditions for various electrical/electromagnetic systems</p> <p>Apply computer mathematical and simulation programs to solve various real life multi- disciplinary topics through circuit solution</p>
	MET01	Engineering Graphics		<p>Make a distinction between first angle projection and third angle projection of drawing.</p> <ol style="list-style-type: none"> 2. Draw hyperbola, parabola, Involutess and Cycloidal curves. 3. Draw sections of solids including cylinders, cones, prisms and pyramids. 4. Draw projections of lines, planes, solids and sections of solids. 5. Draw orthographic projections of lines, planes, and solids.
	CSP02	Data Structures Lab		<p>Understand algorithmic thinking and apply it to programming.</p> <ol style="list-style-type: none"> 2. Be able to design and analyze the time and space efficiency of the data structure.

				<p>3. Be capable to identify the appropriate data structure for given problem.</p> <p>4. Have practical knowledge on the application of data structures</p>
	MEP01	Workshop Practice		<p>Prepare different types of joints by means of wood, i.e., wood working.</p> <p>2. Prepare sand moulds by means of wooden patterns.</p> <p>3. Identify different and prominent tools used in various sections of workshop.</p> <p>4. Make a distinction between Lap, Butt and T – joints in welding processes.</p> <p>5. Perform markings, cutting, and filing on steel specimens by fitting tools.</p>
	MAT 03	ENGINEERING MATHEMATICS-III		<p>Perform operations on various discrete structures such as sets, functions, relations, and sequences. Ability to solve problems using Counting techniques, Permutation and Combination, Recursion and generating functions.</p> <p>Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems.</p> <p>Understand the various properties of algebraic systems like Rings, Monoids and Groups</p>
	CST 03	DIGITAL LOGIC DESIGN		<p>Understand different Number systems, Codes, Logic Gates, Boolean laws & theorems.</p> <p>Simplify the Boolean functions to the minimum number of literals.</p> <p>Design & implement different types of combinational logic circuits using Logic gates</p> <p>Design & implement different types of sequential logic circuits using Flip Flops.</p> <p>Design & implement different types of Counters, Registers, and Programmable Logic Devices.</p>
	CST 04	DISCRETE MATHEMATICAL STRUCTURES	2017	<p>For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives</p> <p>For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference For a given a mathematical problem, classify its algebraic structure</p>

				<p>Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra</p> <p>Develop the given problem as graph networks and solve with techniques of graph theory.</p>
ECT 41	ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING	2017	<p>Know the characteristics of diodes and transistors</p> <p>Design simple circuits and mini projects. know the benefits of feedback in amplifier</p> <p>Compare and classify oscillators.</p> <p>Know the characteristics of diodes and transistors</p>	
CST 05	JAVA AND ADVANCED DATA STRUCTURES	2017	<p>Identifying classes, objects, members of a class and the relationships among them needed for a specific problem.</p> <p>OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.</p> <p>Ability to develop the skills to apply java programming in problem solving to extend his/her knowledge of java programming with various backends further on his/her own.</p> <p>Design to create structure of web page(more dynamic and interactive), to store the data in web document, and transport information through web.</p> <p>Identify the problems in Servlets and overcome those using Java Server Pages also develop JSP applications with Model View Control architecture.</p> <p>Choosing the best Data structure for solving their Real time problems.</p>	
MAT 04	PROBABILIT	2017	<p>The objective of this course is to familiarize the students with statistical techniques.</p>	

		Y AND STATISTICS		It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline
ECP 01	ELEMENTS OF ELECTRONICS AND COMMUNICATION LABORATORY	2017	<p>Understand the diode and transistor characteristics</p> <p>Verify the rectifier circuits using diodes and implement them using hardware.</p> <p>Design the biasing circuits like self biasing. 4. Design various amplifiers like CE, CC, common source amplifiers and implement them using hardware and also observe their frequency responses</p> <p>Analyze the concepts of SCR and observe its characteristics Remember the concepts of unipolar junction transistor and observe its characteristics</p> <p>Understand the construction, operation and characteristics of JFET and MOSFET, which can be used in the design of amplifiers.</p> <p>Understand the need and requirements to obtain frequency response from a transistors that</p> <p>Design of RF amplifiers and other high frequency amplifiers is feasible</p>	
CSP 03	JAVA AND ADVANCED DATA STRUCTURES LABORATORY	2017	<p>Implementing classes, objects, members of a class and the relationships among them needed for a specific problem.</p> <p>OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading. Design to develop the skills to apply java programming in problem solving to extend his/her knowledge of java programming with various backends further on his/her own. Design to create structure of web page(more dynamic and interactive), to store the data in web document, and transport information through web.</p> <p>Identify the problems in Servlets and overcome those using Java Server Pages also develop</p>	

				JSP applications with Model View Control architecture. Choosing the best Data structure for solving their Real time problems.
CST 06	COMPUTER ORGANIZATION	2017	<p>To know the architecture of a computer. To learn ALP Programming</p> <p>Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.</p> <p>Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology</p>	
CST 07	DATA BASE MANAGEMENT SYSTEMS	2017	<p>Able to apply the concepts and design database for given information system.</p> <p>Develop database programming skills in SQL. Be familiar with the relational database theory and be able to write relational algebra expressions for queries</p> <p>Apply the concepts of Normalization and design database which possess no anomalies.</p> <p>Able to write application programs considering the issues like concurrency control, recovery and security.</p> <p>Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing</p>	
CST08	PYTHON PROGRAMMING LANGUAGE	2017	<p>Define and demonstrate the use of built-in data structures “lists” and “dictionary”. Design and implement a program to solve a real world problem.</p> <p>Design and implement GUI application and how to handle exceptions and files</p> <p>Make database connectivity in python programming language</p>	

MAT 05	COMPUTER ORIENTED NUMERICAL METHODS	2017	<p>Choose the appropriate numerical methods for solving engineering problems using C language Demonstrate understanding of different numerical methods. Derive numerical methods for various mathematical operations and tasks such as interpolation, integration, to calculate the solution of linear & non-linear equations and solve differential equations. Compare and distinguish between different numerical methods solving engineering problems giving better optimal results and roots of equation</p> <p>Test and evaluate the accuracy of common numerical methods.</p> <p>Design and develop numerical methods for solving complex engineering problems by combining numerical algorithms of linear & non-linear equations</p>
MAT06	COMPUTER ORIENTED OPTIMIZATIO N TECHNIQUES	2017	<p>Understanding the Concept of optimization and classification of optimization problems. Formulation simplex methods variable with upper bounds Study the Queuing Model, poison and exponential distributions Understand the maximization and minimization of convex function To study equality constraints, inequality constraints</p>
MET 41	SIMULATION AND MODELLING	2017	<p>Discuss the fundamental elements of discrete-event simulation including statistical models, random processes, random variates, and inputs to simulation Analyze a real world problem and apply modelling methodologies to develop a discrete-event simulation mode Recognize the cost/benefits of computer simulation, the generation of meaningful results, decision making, and risks</p> <p>Interpret and contrast discrete-event techniques for implementing a solution to a simulation problem</p>

				Compare and evaluate alternative system designs using sampling and regression
	EEP 04	Electrical Engineering Laboratory	2017	Demonstrate and able to explain electrical components, electrical circuits and Kirchoff's laws. Acquire knowledge of DC circuit analysis, DC network theorems and their applications Formulate and solve complex AC, DC circuits. Understand the principles of operation of DC machines, single phase transformers and three phase induction motors Identify the starting methods of starting synchronous and induction motors and speed control methods for DC motors
	CSP 05	DATABASE MANAGEMEMENT SYSTEMS LAB	2017	Implement the concepts and design database for given information system. Develop database programming skills in SQL. Design the relational database practically and implement relational algebra expressions for queries Design and implement Normalization and design database which possess no anomalies. Able to write application programs considering the issues like concurrency control, recovery and security. Familiar with basic database storage structures and access technique: file and page organizations, indexing methods including B tree, and hashing
	CSP 06	SIMULATION MODELLING AND PYTHON PROGRAMMING LAB	2017	Design and implement a program to solve a real world problem Design and implement GUI application and how to handle exceptions and files Make database connectivity in python programming language Designing Analyzing a real world problem and apply modelling methodologies to develop a discrete-event simulation model Recognize the cost/benefits of computer simulation, the generation of meaningful results,

				decision making, and risks
	CST 09	THEORY OF COMPUTATION	2017	<p>Write a formal notation for strings, languages and machines.</p> <p>Design finite automata to accept a set of strings of a language.</p> <p>For a given language determine whether the given language is regular or not.</p> <p>Design context free grammars to generate strings of context free language.</p> <p>Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars</p>
	CST10	UNIFIED MODELLING LANGUAGE	2017	<p>Select the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDL Apply basic and Advanced Structural Modeling Concepts for designing real time applications.Design Class and Object Diagrams that represent Static Aspects of a Software System.</p> <p>Analyze Dynamic Aspects of a Software System using Use Case, Interaction and Activity Diagrams.</p> <p>Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems</p>
	CST11	OPERATING SYSTEMS	2017	<p>Create processes and threads.</p> <p>Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access</p>

				<p>ti Design and implement file management system.</p> <p>For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.</p>
	CST12	COMPUTER NETWORKS	2017	<p>Apply the concepts of data Communication in real world.</p> <p>Analyze functionalities of OSI Layers.</p> <p>Compare and contrast various transmission media, flow Control and error detection & correction techniques.</p> <p>Evaluate the routing algorithms & transport protocols for achieving efficiency in societal and real world applications Analyze networking & application protocols with the help of simulation tools.</p> <p>Evaluate the various security Mechanisms in real world applications.</p>
	CST13	PRINCIPLES OF PROGRAMMING LANGUAGES	2017	<p>Describe syntax and semantics of programming languages</p> <p>Analyze the design issues involved in various constructs of programming languages</p> <p>: Explain data, data types, and basic statements of programming languages CO4: Apply object-oriented, concurrency, and exception handling features of PLs. CO5: Design and implement programs in Scheme, ML, and Prolog</p>
	CST14-	SOFTWARE ENGINEERING	2017	<p>Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the</p>

				<p>project</p> <p>Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology. Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice. Able to use modern engineering tools necessary for software project management, time management and software reuse.</p>
CSP 07	COMPUTER NETWORKS AND PRINCIPLES OF PROGRAMMING LAB	2017		<p>Identify and use various networking components Understand different transmission media and design cables for establishing a network Implement any topology using network devices Understand the TCP/IP configuration for Windows and linux</p> <p>Implement device sharing on network Learn the major software and hardware technologies used on computer network</p>
CSP 08	OPERATING SYSTEMS & UNIFIED MODELLING LANGUAGE LAB	2017		<p>Creating processes and threads using C/C++/JAVA/Python</p> <p>Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time C/C++/JAVA/Pyth For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.</p> <p>Design and implement file management system C/C++/JAVA/Python</p> <p>For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between</p>

				CPU and I/O controllers.
	CST15	ARTIFICIAL NEURAL NETWORKS	2017	Introduction to Neural Networks Essentials of Artificial Neural Networks Multilayer feed forward Neural Networks Architecture of Hopfield Network Fuzzy Logic System Components
	CST17	SYSTEMS PROGRAMMING	2017	To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger Describe the various concepts of assemblers and macro processors. To understand the various phases of compiler and compare its working with assembler. To understand how linker and loader create an executable program from an object module created by assembler and compiler. To know various editors and debugging techniques.
	CST18	MICROPROCESSORS AND INTERFACING	2017	Understand the taxonomy of microprocessors and knowledge of contemporary microprocessors. Describe the architecture, bus structure and memory organization of 8085 as well as higher order microprocessors. Explore techniques for interfacing I/O devices to the microprocessor 8085 including several specific standard I/O devices such as 8251 and 8255. Demonstrate programming using the various addressing modes and instruction set of 8085 microprocessor Design structured, well commented , understandable assembly language programs to provide solutions to real world control problems

CST19	SOFTWARE PROJECT MANAGEMENT	2017	<p>Understand how to manage projects.</p> <p>Compare conventional and modern software engineering principles.</p> <p>Explain various phases in modern software management</p> <p>Understand project planning and organization.</p> <p>Apply software metrics and economics in a project</p>
	Microprocessors and Interfacing Laboratory	2017	<p>To understand the internal architecture of microprocessors.</p> <p>To familiarize with the assembly level programming</p> <p>Knowledge of the 8086 instruction set and ability to utilize it in programming.</p> <p>Understanding of the inter 8086 real mode memory addressing</p> <p>Understand multi core processor systems and its advantages</p>
	Algorithms and Systems Programming Lab	2017	<p>Identify the problem given and design the algorithm using various algorithm design techniques.</p> <p>Implement various algorithms in a high level language.</p> <p>Analyze the performance of various algorithms.</p> <p>Compare the performance of different algorithms for same problem</p>
CSE20	Cyber Law and Ethics	2017	<p>Make Learner Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace. Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace;</p> <p>Develop The Understanding Of Relationship Between Commerce And Cyberspace</p> <p>Give Learners In Depth Knowledge Of Information Technology Act And Legal Framework Of</p>

				<p>Right To Privacy, Data Security And Data Protection.</p> <p>Make Study On Various Case Studies On Real Time Crimes</p>
	CST 21	ARTIFICIAL INTELLIGENCE	2017	<p>Demonstrate basic understanding of artificial intelligence and its fundamentals.</p> <p>Possess the skill for representing knowledge using the appropriate technique for a given problem.</p> <p>Possess the ability to apply AI techniques to solve problems of game playing, expert systems, machine learning and robotics.</p> <p>Identify a search algorithm for a problem and estimate its time and space complexities.</p>
	CST22	COMPILER CONSTRUCTION	2017	<p>Master using lexical analyzer and parser generator tools</p> <p>Master building symbol tables and generating intermediate code.</p> <p>Master generating assembly code for a RISC machine.</p> <p>Master programming in Java. Be familiar with compiler architecture.</p> <p>Be familiar with register allocation</p> <p>Be exposed to compiler optimization</p>
	CSE02	ELECTIVE II CYBER	2017	<p>Analyze and evaluate the cyber security needs of an organization. Conduct a cyber security risk assessment. Measure the performance and troubleshoot cyber security systems.</p>

		SECURITY		<p>Implement cyber security solutions.</p> <p>Be able to use cyber security, information assurance, and cyber/computer forensics software/tools</p> <p>Identify the key cyber security vendors in the marketplace.</p> <p>Design and develop a security architecture for an organization.</p> <p>Design operational and strategic cyber security strategies and policies.</p>
	CSE03	DATA ANALYTICS	2017	<p>Understand Big Data and its analytics in the real world</p> <p>Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics</p> <p>Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm</p>
		MANAGERIAL ACCOUNTANCY	2017	<p>Differentiate methods of schedule costs as per unit of production . Differentiate methods of calculating stock consumption</p> <p>Identify the specifics of different costing methods</p> <p>Analyze cost-volume-profit techniques to determine optimal managerial decisions.</p> <p>Apply cost accounting methods for both manufacturing and service industry.</p>
		CORE LAB	2017	<p>To Program using lexical analyzer and parser generator tools. building symbol tables and generating intermediate code.</p> <p>generating assembly code for a RISC machine.</p> <p>programming in Java. Be familiar with compiler architecture</p>
		ELECTIVE-I LAB	2017	<p>Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm</p> <p>Conduct a cyber security risk assessment. Measure the performance and troubleshoot cyber security systems.</p>

				<p>Implement cyber security solutions.Design and develop a security architecture for an organization.</p> <p>Design operational and strategic cyber security strategies and policies.</p>
	CSE 24-2	Elective IV Computer Graphics	2017	<p>Image processing as picture analysis</p> <p>Geometrical transformations and 2D ,3D operations</p> <p>Viewing in 3D projection</p>
	MET 42	Industrial Management	2017	<p>Understand the concepts related to Business.</p> <p>Demonstrate the roles, skills and functions of management.</p> <p>Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.</p> <p>Understand the complexities associated with management of human resources in the organizations</p> <p>and integrate the learning in handling these complexities</p>
		Managerial Economics	2017	<p>Recognize financial statements, their importance and usages. Understand major principles of financial accounting, cost accounting and financial management.</p> <p>Utilize the tools and techniques for economic analysis of alternative opportunities, considering time value of money and risk associated with returns.</p> <p>Appraise investment opportunities considering forthcoming changes in economy, including inflation and their effect.</p> <p>Rank the opportunities with proper justifications</p> <p>Make optimal engineering investment decisions.</p>

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CSE M.TECH SYLLABUS

S. No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
		DATA STRUCTURES AND ALGORITHMS	2017	<p>Acquire knowledge of various Methods and Notations for comparing the performance of various Data Structures.</p> <p>2. Acquire knowledge of development of linear data structures like stacks, Queues and their operations, Implementation using Arrays and Linked Lists.</p> <p>3. Acquire knowledge of properties of Binary Search Trees and balanced binary search trees.</p> <p>4. Acquire knowledge of Hashing, String Searching Algorithms and their implementation</p>
		ADVANCED TOPICS IN DATABASE MANAGEMENT SYSTEMS	2017	<p>Acquire knowledge to Develop skills to design and analyze of logical and Physical databases</p> <p>2. Acquire knowledge to Parallel and Distributed Databases.</p> <p>3. Acquire knowledge to Data Warehousing and Decision Support.</p> <p>4. Acquire knowledge to Information Retrieval and XML Data</p>
		CRYPTOGRAPHY AND NETWORK SECURITY	2017	<p>Acquire the knowledge of develop Traditional Symmetric-Key Ciphers</p> <p>2. Acquire the knowledge of develop Modern Symmetric-Key Ciphers.</p> <p>3. Acquire the knowledge of develop Encipherment Using Modern Symmetric-Key</p>

				<p>Ciphers.</p> <p>4. Acquire the knowledge of develop Message Integrity, Random Oracle model, Message Authentication. Cryptographic Hash Functions.</p> <p>5. Acquire the knowledge of develop Network Security</p>
	CSCOT 07E	MACHINE LEARNING	2017	<p>Acquire knowledge to develop Machine Learning Applications.</p> <p>2. Acquire knowledge to develop Multivariate Methods.</p> <p>3. Acquire knowledge to develop Nonparametric Methods.</p> <p>4. Acquire knowledge to develop Kernel Machines.</p>
	CSCOT 08E	RESEARCH METHODOLOGY	2017	<p>Acquire knowledge to Develop Performance Evaluation of a Computer-based System.</p> <p>2. Acquire knowledge to Develop Probability Distributions.</p> <p>3. Acquire knowledge to Develop Statistical Inference.</p> <p>4. Acquire knowledge to Develop Optimization Problems.</p> <p>5. Acquire knowledge to Design and Analysis of simulation models</p>
		INTERNET OF THINGS	2017	<p>Acquire knowledge to Develop Internet of Things.</p> <p>2. Acquire knowledge to Develop IoT System Management with NETCONF-YANG.</p> <p>3. Acquire knowledge to Develop IoT Physical Devices & Endpoints.</p> <p>4. Acquire knowledge to Develop IoT Design: Home Automation.</p> <p>5. Design and Analysis of Data Analytics for IoT</p>
		CORE-I LABORATORY	2017	<p>Acquire knowledge to Develop skills to design and analyze of logical and Physical databases</p> <p>6. Acquire knowledge to Parallel and Distributed Databases.</p>

				<p>7. Acquire knowledge to Data Warehousing and Decision Support.</p> <p>8. Acquire knowledge to Information Retrieval and XML Data</p> <p>9. Acquire the knowledge of develop Traditional Symmetric-Key Ciphers</p> <p>10. Acquire the knowledge of develop Modern Symmetric-Key Ciphers.</p> <p>11. Acquire the knowledge of develop Encipherment Using Modern Symmetric-Key Ciphers.</p> <p>12. Acquire the knowledge of develop Message Integrity, Random Oracle model, Message Authentication. Cryptographic Hash Functions.</p> <p>13. Acquire the knowledge of develop Network Security</p> <p>14. Acquire the knowledge of design and analyze linear and nonlinear data structures.</p> <p>15. Acquire the knowledge of algorithms for manipulating linked lists, stacks, queues, trees and graphs.</p> <p>16. Acquire the knowledge of recursive algorithms as they apply to trees and graphs.</p>
	CSCOP 02	ELECTIVE-I LABORATORY	2017	<p>Acquire knowledge to develop Machine Learning Applications.</p> <p>7. Acquire knowledge to develop Multivariate Methods.</p> <p>8. Acquire knowledge to develop Nonparametric Methods.</p> <p>9. Acquire knowledge to develop Kernel Machines.</p> <p>10. Acquire knowledge to Design and Analysis of Machine Learning Experiments</p> <p>11. Acquire knowledge to Develop Probability Distributions.</p> <p>12. Acquire knowledge to Develop Statistical Inference.</p> <p>13. Acquire knowledge to Develop Optimization Problems.</p>

				<p>14. Acquire knowledge to Design and Analysis of simulation models</p> <p>15. Acquire knowledge to Develop IoT Physical Devices & Endpoints.</p> <p>16. Acquire knowledge to Develop IoT Design: Home Automation.</p> <p>17. Design and Analysis of Data Analytics for IoT</p>
		ADVANCES IN ARTIFICIAL INTELLIGENCE	2017	<p>Acquire knowledge of State-Space Search.</p> <p>Acquire knowledge of Game playing algorithms.</p> <p>Acquire knowledge of Genetic Algorithms and Neural networks.</p> <p>Acquire knowledge of robotic Control Systems.</p> <p>Acquire knowledge of Deep learning –Convolution networks</p>
	CSCOT 05C	TOPICS IN OPERATING SYSTEMS	2017	<p>1. Acquire knowledge of CPU scheduling algorithms.</p> <p>2. Acquire knowledge of , File system implementation.</p> <p>3. Acquire knowledge of Distributed Systems .</p> <p>4. Acquire knowledge of internals of - Linux Operating System.</p> <p>5. Acquire knowledge of Internals of - MAC Operating System</p>
		DISTRIBUTED AND CLOUD COMPUTING	2017	<p>Acquire knowledge of Distributed System Models.</p> <p>Acquire knowledge of Virtual Machines and Virtualization of Clusters.</p> <p>Acquire knowledge of Service-Oriented Architectures.</p> <p>Acquire knowledge of Cloud Programming.</p> <p>Acquire knowledge of Peer-to-Peer Computing Systems.</p>
	CSCOT 10E	ARTIFICIAL NEURAL NETWORKS	2017	<p>Acquire knowledge of Pattern recognition methods.</p> <p>Acquire knowledge of Functional Units of ANNs for Pattern Recognition Tasks.</p> <p>Acquire knowledge of Feed-back Neural Networks.</p>

				<p>Acquire knowledge of Competitive Learning Neural Networks.</p> <p>Acquire knowledge of Applications of ANNs.</p>
	CSCOT 11E	BIG DATA ANALYTICS	2017	<p>Acquire knowledge of Statistical Limits on Data Mining.</p> <p>Acquire knowledge of Applications of Near-Neighbor Search.</p> <p>Acquire knowledge of A-Priori Algorithm.</p> <p>Acquire knowledge of On-Line Algorithms.</p> <p>Acquire knowledge of Mining Social-Network Graphs.</p>
	CSCOT 12E	CYBER SECURITY	2017	<p>Acquire knowledge of Building a Secure Organization, Preventing System Intrusions.</p> <p>Acquire knowledge of Wireless Network Security.</p> <p>Acquire knowledge of Intrusion Prevention and Detection Systems.</p> <p>Acquire knowledge of Virtual Private Networks.</p> <p>Acquire knowledge of Biometrics.</p>
	CSCOP 03	CORE-II LABORATORY	2017	<p>Acquire knowledge of State-Space Search.</p> <ol style="list-style-type: none"> 2. Acquire knowledge of Game playing algorithms. 3. Acquire knowledge of Genetic Algorithms and Neural networks. 4. Acquire knowledge of Deep learning –Convolution networks 5. Acquire knowledge of CPU scheduling algorithms. 6. Acquire knowledge of , File system implementation. 7. Acquire knowledge of Distributed Systems . 8. Acquire knowledge of internals of - Linux Operating System. 9. Acquire knowledge of Internals of - MAC Operating System. 10. Acquire knowledge of Distributed System Models.

				11. Acquire knowledge of Cloud Programming. 12. Acquire knowledge of Peer-to-Peer Computing Systems
	CSCOP 04	ELECTIVE-II LABORATORY	2017	Acquire knowledge of Statistical Limits on Data Mining. 2. Acquire knowledge of Applications of Near-Neighbor Search. 3. Acquire knowledge of A-Priori Algorithm. 4. Acquire knowledge of On-Line Algorithms. 5. Acquire knowledge of Mining Social-Network Graphs 6. Acquire knowledge of Building a Secure Organization, Preventing System Intrusions. 7. Acquire knowledge of Wireless Network Security. 8. Acquire knowledge of Intrusion Prevention and Detection Systems. 9. Acquire knowledge of Virtual Private Networks. 10. Acquire knowledge of Biometrics

46. ECE B.TECH SYLLABUS

S . N o	Course Code	Name of the Course	Year of Introduction	Course Outcomes
	CST01	Computer Programming	2017	Able to design the flowchart and algorithm for real world problems 2. Able to learn and understand new programming languages

				<p>3. Able to construct modular and readable programs</p> <p>4. Able to write C and C++ programs for real world problems using simple and compound data types</p> <p>5. Adapt programming experience and language knowledge to other programming language contexts</p> <p>6. Good programming style, standards and practices during program development</p>
	CET01	Environmental Studies	2017	<p>Acquire knowledge in</p> <ul style="list-style-type: none"> Diverse components of environment and natural resources Ecosystem and biodiversity & its conservation methods Population growth and human health Green technology <p>2. Identify and resolve the issues related to sources of different types of pollutions</p> <p>3. Provide solutions to individuals, industries and government for sustainable development of natural resources</p> <p>4. Apply environmental ethics in protection of diversified ecosystems.</p>
	CET02	Basic Civil Engineering	2017	<p>To find the suitability of various building materials at a particular location in the building construction.</p> <p>2. Take accurate measurements, field booking, plotting and adjustment of errors can be understood</p> <p>3. Analyze the status of water quality standards for drinking and construction</p> <p>4. Classify the roads and bridges</p>

MET02	Basic Mechanical Engineering	2017	<ul style="list-style-type: none"> 1. Understand basics of thermodynamics and components of thermal plant 2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice. 3. Understand basics of heat transfer, refrigeration and internal combustion engines. 4. Understand mechanism of power transfer through belt, chain, rope and gear drives. 5. Understand functions and operations of machine tools including milling, grinding, and shaping machines.
ENT01	English	2017	<p>Student will be able to get a thorough knowledge of various topics of grammar of English language.</p> <ul style="list-style-type: none"> 2. Student will be trained in close reading of language and its relation to literary form. 3. Student will be able to read English correctly with focus on fluency and pronunciation. 4. Student will be able to understand the use of English through computer software. 5. Student will be in a position to face computer based competition exams like TOEFL. 6. They will get an ability to communicate effectively and to write accurately using English language.
CSP01	Computer Programming Lab	2017	<p>Able to have fundamental concept.</p> <ul style="list-style-type: none"> 2. Able to write, compile and debug programs in C language. 3. Able to formulate problems and implement algorithms in C. 4. Able to effectively choose programming components that efficiently solve computing problems in real-world. 5. Able to use different data types in a computer program. 6. Able to design programs involving decision structures, loops and functions

	ENP01	English Communication Lab	2017	Students gain felicity in using language software. 2. They are exposed to different accents of the language.
	MEP – 01 :	WORKSHOP PRACTICE	2017	: apply knowledge of mathematics, science, and engineering, CO2: design and draft the objects. CO3: design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. CO4: function on multidisciplinary teams, CO5: identify, formulates, and solves engineering problems, CO6: of professional and ethical responsibility, CO7: communicate effectively, CO8: broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context, CO9: recognition of the need for, and an ability to engage in life-long learning, C10: knowledge of contemporary issues, C11: use the techniques, skills, and modern engineering tools necessary for engineering practice. C12: learn how to reduce the work repeatability.
	MAT02	Engineering Mathematics – II	2017	Use ranks of matrices to decide whether the system of linear equations is consistent or not and hence solve. 2. Use Cayley-Hamilton theorem to find inverses or powers of matrices. 3. Use Eigen values and vectors to reduce Quadratic forms to normal form. 4. Ability to analyze motion problems from real lines to curves and surfaces in 3-D. Use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.

				<p>5. To use Green's theorem to evaluate line integrals along simple closed contours on the plane</p> <p>6. To use Stokes' theorem to give a physical interpretation of the curl of a vector field</p> <p>7. To use the divergence theorem to give a physical interpretation of the divergence of a vector field.</p> <p>8. Find the Fourier series representation of a function of one variable. It is representation of a function as a series of constants times sine and cosine functions of different frequencies in order to see periodic phenomenon have long fascinating mankind.</p> <p>9. Evaluation of certain improper integrals is made simple with introduction of Gamma and Beta functions</p> <p>10. Primary motivation for studying certain special functions is that they arise in solving certain ordinary differential equations that model many physical phenomenon. They constitute necessary items in the toolkit of anyone who wishes to understand the work with such models</p>
	CST02	Data Structures	2017	<p>. A knowledge of various Methods and Notations for comparing the performance of various Data Structures.</p> <p>2. A knowledge of development of linear data structures like stacks, Queues and their operations, Implementation using Arrays and Linked Lists.</p> <p>3. A knowledge of properties of Binary Search Trees and balanced binary search trees.</p> <p>4. A knowledge of properties of Splay Trees, Red Black Trees, AVL Trees and their implementation</p>
	PHT01	Engineering Physics	2017	<p>Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.</p> <p>2. Ability to understand the crystal geometries and estimation of crystal structure by X-ray</p>

				<p>diffraction techniques.</p> <p>3. Students demonstrate the ability to identify and apply appropriate analytical and mathematical tools of physics in solving engineering problems.</p> <p>4. Students demonstrate the ability to apply knowledge of band theory in the area of electronics and understanding the basic electron transportation phenomenon in micro devices.</p> <p>5. Student's ability to understand the principles in the production and applications of lasers and their effective utilization in optical communication and detection.</p> <p>6. Students demonstrate the ability to understand size depended properties of nano dimensional materials and their effective utilization in making nano and micro devices for further microminiaturization of electronic devices</p>
	CYT01	Engineering Chemistry	2017	<p>To understand the importance of the water and its quality</p> <p>2. To identify uses of electrochemical processes in nature and industry</p> <p>3. To understand properties of good fuel for reducing auto exhaust gases to the environment</p> <p>4. To understand synthesis, properties and engineering applications of polymers</p> <p>5. To know the procedure and analysis of cementing materials</p>
	EET02	CIRCUIT THEORY	2017	<p>CO1: An ability to apply the concepts of electrical circuits</p> <p>CO2: An ability to solve networks using topology principles, network thermos, transient analysis</p>
	MET01	Engineering Graphics	2017	<p>Make a distinction between first angle projection and third angle projection of drawing.</p> <p>2. Draw hyperbola, parabola, Involutes and Cycloidal curves.</p> <p>3. Draw sections of solids including cylinders, cones, prisms and pyramids.</p> <p>4. Draw projections of lines, planes, solids and sections of solids.</p>

				5. Draw orthographic projections of lines, planes, and solids.
	CSP02	Data Structures Lab	2017	Understand algorithmic thinking and apply it to programming. 2. Be able to design and analyze the time and space efficiency of the data structure. 3. Be capable to identify the appropriate data structure for given problem. 4. Have practical knowledge on the application of data structures
	MEP01	Workshop Practice	2017	Prepare different types of joints by means of wood, i.e., wood working. 2. Prepare sand moulds by means of wooden patterns. 3. Identify different and prominent tools used in various sections of workshop. 4. Make a distinction between Lap, Butt and T – joints in welding processes. 5. Perform markings, cutting, and filing on steel specimens by fitting tools.
	EET03	NETWORK ANALYSIS	2017	Understand basics electrical circuits with nodal and mesh analysis. 2. Appreciate electrical network theorems. 3. Apply Laplace Transform for steady state and transient analysis. 4. Determine different network functions. 5. Appreciate the frequency domain techniques
	ECT 02	ELECTRONIC DEVICES		Develop a basic understanding of semiconductor physics, PN Junction diodes, Zener diode, Tunnel diode, UJT. CO2 Understand and analyze the operation of Rectifiers. CO3 Understand and analyze the operation of Bipolar Junction Transistors CO4 Understand and analyze the operation of Bipolar Junction Transistors & Field Effect Transistors CO5 Understand and analyze the operation of optoelectronic Devices

	ECT03	SIGNALS AND SYSTEMS		<p>CO1: To identify different classes of signals and methods of representing the signals</p> <p>CO2: To know the basic functions like unit step, ramp etc. and their properties</p> <p>CO3: To find the response of LTI system</p> <p>CO4: To find the filter characteristics of LTI system</p> <p>CO5: To know the condition of causality and stability</p> <p>CO6: To know the definition of convolution and apply the same for some specific examples</p> <p>CO7: To know the definition of correlation and apply the same for some specific examples</p> <p>CO8: To find the Laplace transforms and inverse Laplace transforms of certain circuits</p> <p>CO9: To evaluate the region of convergence (ROC) and constraints on ROC</p> <p>CO10: To know the Z- transform and find Z-transform for selected example</p> <p>CO11: To find the system response to standard signals</p>
	ECT04	ELECTROMAGNETIC FIELDS AND WAVES	2017	<p>: analyze Electrostatic fields and its applications in ECG,EEG etc.</p> <p>CO2: find energy stored in electric field and find resistance and capacitance.</p> <p>CO3: analyze Electromagnetic fields & its applications in motors, transformers, microphones, memory stores etc.</p> <p>CO4: find energy stored in magnetic field and find Inductance. CO5: solve EM fields in both Time and Frequency Domains. CO6: understand polarization in Dielectrics.</p> <p>CO7: analyze propagation of EM waves in different medium. CO8: study and analyze parallel and perpendicular polarizations.</p> <p>CO9: understand reflection of plane waves by normal and oblique incidence.</p> <p>CO10: find Brewster angle in different polarizations.</p> <p>CO11: apply EM fields in Transmission lines, Waveguides and Antennas. CO12 find applications</p>

				of EM waves in Microwaves
	EET 41	ELECTRICAL TECHNOLOGY	2017	CO1: explain the operation & Characteristic of DC machines. CO2: explain the operation & performance of transformer. CO3: calculate efficiency of various Induction motors. CO4: determine regulation by synchronous impedance method (OC test & SC test).
	EEP 41	ELECTRICAL CIRCUITS AND MACHINES LAB	2017	CO1:verify various laws using electrical instruments CO2: measure the coil parameters like R, L, X, Z. CO3: verify various theorems in DC circuits. CO4:get familiar with series resonance in ac circuit. CO5: know about different parameters of DC circuit. CO6:get familiarwith current locus diagrams with one element fixed while other varying. CO7: know about transient response characteristics ofdifferent circuits with PSIM software. CO8:perform goodin viva-voce exams CO9: know about the latest practical trends in electrical fields. CO10: know about different software's which are used for simulation of electrical networks. CO11: know about applications of different theorems.
	ECP01	MATLAB AND SIMULATION LAB	2017	CO1: Perform basic matrix operations and evaluate the function CO2: Solve polynomial, linear equations CO3: Sketch desired waveforms and shapes CO4: Compute the signal processing techniques, such as convolution, correlation etc., CO5: Determine the calculus functions such as differentiation, integration etc., CO6: Analyse the statistics of the data by computing mean, median, mode etc., CO7: To display the system time in UNIX CO8: Compute some basic mathematical operation such as factorial etc., in UNIX CO9: Check given year is a leap year or not, check to given number is prime or not in UNIX

				<p>CO10: Search the files or a word in UNIX</p> <p>CO11: Categorize the statistical data according to the different ranges</p>
ECT05	ELECTRONIC CIRCUITS ANALYSIS	2017	<p>CO1: analyze, design, simulate and build amplifier circuits, and measure their properties.</p> <p>CO2: Design and produce small signal amplifier circuits for various practical applications to meet a given specification.</p> <p>CO3: Understand the operating principles of major electronic amplifiers, circuit models. CO4: Able to analyze single stage and multi stage amplifiers analytically.</p> <p>CO5: An ability to analyze linear electronic circuits at both low and high frequencies.</p> <p>CO6: Understand the concepts of both positive and negative feedback in electronic circuits.</p> <p>CO7: Learn how negative feedback is used to stabilize the gain of amplifier and how positive feedback can be used to design an oscillator.</p> <p>CO8: Acquire experience in building and trouble-shooting simple electronic analog circuits</p>	
ECT06	PULSE & DIGITAL CIRCUITS	2017	<p>CO1: learn the operating principles of linear wave shaping circuits like RC low pass and highpass circuits.</p> <p>CO2: design RC low pass and high pass circuits for different RC time constants.</p> <p>CO3: understand the operating principles and design of non-linear wave shaping circuits likediode clippers and clampers.</p> <p>CO4: understand electronic switches using transistors. CO5: design different multivibrators using transistors. CO6: design different triggering mechanisms.</p> <p>CO7: understand the different applications of the multivibrators. CO8: design UJT sweep</p>	

				<p>circuits.</p> <p>CO9: design different sweep circuits with improved sweep linearity. CO10: design monostable and astablemultivibrators using IC 555 timer.</p> <p>CO11: understand the usage of single and dual timers in different applications. Co12: understand different IC families and their comparision</p>
ECT07	SWITCHING THEORY AND LOGIC DESIGN	2017	<p>CO1: To apply principles of Boolean algebra to manipulate and minimize logic expression</p> <p>CO2: To use K-maps and tabular method to minimize logic functions</p> <p>CO3: To design logic functions with logic gates</p> <p>CO4: To design combinational circuits</p> <p>CO5: To learn operation of latches, flip-flops, couners and registers</p> <p>CO6: To analyze the operation of sequential circuits</p> <p>CO7: To learn different arithmetic circuits</p> <p>CO8: To learn building blocks of digital systems</p> <p>CO9: To learn about ROM, RAM and its implementation</p> <p>CO10: learn the operation of state of art components to design and build digital systems such as PLA, PALs and PLDs</p> <p>CO11:To articulate how modern microelectronics has impacted society</p> <p>CO12: To identify paper related to the applications of digital system in society, read and summarize the</p>	
ECT08	RANDOM SIGNALS AND STOCHASTIC	2017	<p>CO1: Able to evaluate probability for different experiments</p> <p>CO2: obtain Distribution function, Density functions, and Conditional density functions for different</p>	

		PROCESSES		<p>Random variables.</p> <p>CO3: Able to obtain Expected value of function of random variables by applying different operations. CO4: Able to evaluate Transformations of multiple random variables.</p> <p>CO5: apply Concept of Stationarity, Independence, Time averages, Ergodicity for Random processes</p> <p>CO6: Able to obtain Power spectrum for discrete time processes and sequences. CO7: Able to obtain Random signal response of linear system</p> <p>CO8: Able to calculate Noise bandwidth for Band-pass, Band-limited, and Narrow-band processes</p> <p>CO9: Able to Model of different Noise Sources.</p> <p>CO10: Able to analyze matched filter and Wiener filter.</p> <p>CO11: apply the concept of Random variables to find noise in AM and FM communicationsystems. CO12: Able to apply the concept of Random variables for RADAR detection.</p>
	ECT09	ANALOG COMMUNICATIONS	2017	<p>Able to demonstrate about various blocks in analog communication system. CO2: Able to analyze and design the analog modulator and demodulator circuits. CO3: Able to calculate the effect of noise in analog modulations.</p> <p>CO4:Able to demonstrate about various blocks in Transmitters and Receivers</p> <p>CO5: Able to know about AM Radio Broadcasting Frequency</p> <p>CO6: Able to know FM Radio Broadcasting Frequency</p> <p>CO7: Able to know the quality difference between AM and FM stations. CO8: Able to know the community services of Radio stations.</p>

				<p>CO9: Able to know the Complex Mathematics in AM and FM signals. CO10: Able to know how to sample the analog signal to discrete signal. CO11: Able to know the types of noises that effect the modulation schemes.</p> <p>CO12: Able to know different multiplexing techniques possible in time and frequency</p>
	ECT10	TRANSMISSION LINES AND WAVEGUIDES	2017	<p>Understand Primary ,Secondary Constants and equivalent circuit of Transmission line</p> <p>CO2: Derive Transmission line equations and also Propagation constant Characteristics implements</p> <p>CO3: Compute Input impedance of Transmission line O.C & S.C lines. CO4: The relation between VSWR & reflection coefficient.</p> <p>CO5: Understand the Impedance Matching methods.</p> <p>O6: Understand the application and properties of smith chart.</p> <p>CO7: Understand TE, TM and TEM Waves based on Helmholtz equation and boundaryconditions . CO8: Analyze velocity of propagation, attenuation and wave impedance.</p> <p>CO9: Understand TE, TM waves in rectangular waveguides. CO10: Understand TE, TM waves in circular waveguides.</p> <p>CO11: Calculate wave and characteristic impedance, Attenuation and Q of waveguides</p>
	EET42	CONTROL SYSTEMS	2017	<p>: apply knowledge of linear control systems.</p> <p>CO2: know the classification of control systems, block diagrams and their reductions. CO3: learn signal flow graphs and mason's gain formula.</p> <p>CO4: Understand the transfer function of electrical, mechanical and electro – mechanical elements through mathematical modeling.</p> <p>CO5: Understand the derivations of both ac & dc servo motors.</p> <p>CO6: know the test signals and response of first & second order systems. CO7: Understand the</p>

				time domain analysis, derivate and integral controllers. CO8: Understand the Stability of control systems - Routh Hurwitz criterion. CO9: learn Root locus – rules for the construction of root loci CO10: Understand the Frequency domain analysis - correlation between time and frequency response –frequency response plots. CO11: design and construct – polar plots – Bode plots - Gain margin and Phase margin
	ECP02	ELECTRONIC CIRCUITS ANALYSIS LAB	2017	Should be able to design and analyze the voltage amplifiers CO2: Should be able to calculate the efficiency of class – A power amplifiers CO3: Should be able to determine the load regulation and line regulation for the voltage regulators
	ECP03	ANALOG COMMUNICAT ION LAB	2017	CO1: Study amplitude modulation and demodulation CO2: Study FM generator and observe its output waveform CO3: Generate pulse amplitude modulated wave and demodulate the same CO4: Generate DSBSC wave using balanced modulator CO5:Generate pulse width modulated wave and demodulate the same CO6: Generate pulse position modulated wave and demodulate the same CO7: Study the carrier modulation technique by Binary phase shift keying modulation & demodulation CO8: Study the behavior of pre-emphasis and de-emphasis circuits CO9: Study 3 channel time division multiplex generator CO10: Study sample and hold circuit CO11: Effect of noise on various analog systems and also calculate signal-to-noise ratio
	EOT01	ECONOMICS	2017	To gain introduction to managerial economics and demand analysis

				<p>2. To estimate Cost Analysis Production and Supply Analysis</p> <p>3. To understand Price and Output Decisions Under Different Market Structures</p> <p>4. To be able to analyze Profit Management</p>
	ECT11	ANALOG IC APPLICATIONS	2017	<p>: Understand the operation of analog electronic circuit systems and their components.</p> <p>CO2:demonstrate the use of analog circuit analysis techniques to analyze the operation and behavior of various analog integrated circuits.</p> <p>CO3: design differential amplifier using operational amplifier</p> <p>CO4: analyze stability of operational design differential amplifier using operational amplifier amplifiers</p> <p>CO5: apply frequency compensation techniques for amplifiers</p> <p>CO6: design the different waveform generators using operational amplifiers.</p> <p>CO7: design linear applications circuits such as summer, integrator, and differentiator etc using op-amplifiers.</p> <p>CO8: design circuits such as log, comparator and multiplier etc using operational amplifiers.</p> <p>CO9: analyze basic operation of PLL.</p> <p>CO10: implement various applications of PLL CO11: design and realize voltage regulators</p>
	ECT12	ANTENNAS AND WAVE PROPAGATION	2017	<p>To demonstrate basic understanding of the radiation of electromagnetic waves by antennas.</p> <p>CO2: To develop expressions for antenna parameters and make practical calculations</p> <p>CO3: To calculate the radiation resistance for quarter wave monopole and half wave dipole</p> <p>CO4: To demonstrate the principle of pattern multiplication</p> <p>CO5: To design broad side and end-fire arrays and sketch the patterns for sample cases CO6: To design folded dipole and apply the same in the construction of yagi-uda array CO7: To design V</p>

				<p>and Rhombic antennas and make sample calculations</p> <p>CO8: To derive Friis transmission formula and solve some numerical examples</p> <p>CO9: To apply the corrections to the propagation model taking the effect of earth curvature</p>
	ECT13	ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	2017	<p>demonstrate the importance of various errors in the measurement process.</p> <p>CO2: design of various devices like DC Ammeter and DC voltmeters using PMMC, ohmmeters.</p> <p>CO3: demonstrate internal structure, working and design of various electronic devices like true RMS responding voltmeters, AC voltmeters.</p> <p>CO4: demonstrate internal structure, working and design of various subsystems in CRO. CO5: design electrostatic deflection systems.</p> <p>CO6: understand the working principles of special purpose oscilloscopes. CO7: design different electronic devices like Multimeters and Q-meters, etc. CO8: design DC and AC bridges.</p> <p>CO9: understand audio & radio frequency wave analyzers and spectrum analyzers. CO10: understand the working of different Digital voltmeters.</p> <p>CO11: understand the working of different digital instruments like universal counter, tachometers etc.</p> <p>CO12: select a transducer for measurement of various physical parameters like displacement, pressure temperature, strain etc.</p>
	ECT14	DIGITAL COMMUNICATIONS	2017	<p>: Understand the theoretical aspects of digital communication system, useful for today's multidisciplinary applications.</p> <p>CO2: Learn the elements of digital communications systems, fundamental concepts of sampling theorem, quantization and coding.</p> <p>CO3: Understand the different types of digital pulse and band pass modulation techniques.</p>

				<p>CO4: Able to calculate probability of error for method filter Rx and various digital modulation techniques to analyze the performance of DCS in the presence of noise.</p> <p>CO5: Able to do the source coding problems and understand the compact description of sources.</p> <p>CO6: Able to solve the various channel coding problems and analyze the performance of various coding techniques.</p>
	ECT15	COMPUTER ORGANISATION	2017	<p>Able to describe the basic structure and fundamentals of computer.</p> <p>CO2: Able to develop the RTL, Micro operations and micro programmed control. CO3: Design the computer arithmetic logic units to perform different operations</p>
	ECP04	DIGITAL CIRCUITS LAB	2017	<p>CO1: Able to differentiate linear and non-linear wave shaping</p> <p>CO2: Able to design logic gates and flip-flops</p> <p>CO3: Able to design Astable, Monostable and Bistable Multivibrators.</p> <p>CO4: Able to design Schmitt trigger, UJT Relaxation Oscillators and Sweep circuits</p>
	ECP05	DIGITAL COMMUNICATION LAB	2017	<p>1. Understand the Digital communication System and able to analyse the different Digital modulation techniques.</p> <p>2. Understand the concepts of baseband digital modulation schemes and Inter Symbol Interference.</p> <p>3. Analyze Signal space concepts, probability of error performance of various digital binary modulation systems and are able to design digital communication systems.</p> <p>4. Design a system with Error correcting codes by learning Block Codes, Cyclic Codes and</p>
	ECP06	ELECTRONIC	2017	The features of Electronics instrumentation are familiarized.

		MEASUREMENTS LAB		CO2: Different types of meters for calculation of unknown parameters like inductances, Resistances and Capacitance are studied. CO3: Understand the characteristics of transducers and instrumentation Amplifiers. CO4: To acquire skills on using different measuring devices
	MET43	MANAGEMENT SCIENCE	2017	Able to work more creatively. CO2: Able to work in groups CO3: Presenting ideas more effectively and efficiently in formal and informal ways. CO4: Development of fundamental rethinking and radical redesign in the organizations. CO5: Applying the ideas of the course to identifying and solving real world problems. CO6: Development of Group Dynamic Skills
	ECT16	DIGITAL IC DESIGN APPLICATIONS	2017	: design R-2R and Weighted resistors with some numerical problems CO2: design comparator type, successive approximation type etc. A/D converters and study their performance CO3: get familiarized with structural and behavioral description styles along with some examples CO4: get familiarized with basic declarations like entity, process etc. with some examples CO5: write the code for lower and higher order MUX/DEMUX CO6: write the code for encoders/decoders and code converter CO7: write the code for sequential circuits like FFs, converters and shift registers CO8: design ROMs for given specifications CO9: design SRAMS and DRAMS for given specifications CO10: write the code for barrel shifter and floating point encodes CO11: get familiarized with timing and synchronization aspects in the design of ROMs and

				RAMs.
	ECT17	VLSI DESIGN	2017	<p>CO1: History and perspective on IC development. And an ability to explain the chip technology scaling process</p> <p>CO2: use mathematical methods and circuit analysis models in analysis of CMOS digital electronic circuits, including logic components and their interconnect</p> <p>CO3: calculate electrical properties of MOS circuits</p> <p>CO4: apply CMOS technology-specific layout rules in the placement and routing of transistors and interconnect, & to verify the functionality, timing, power, and parasitic effects.</p> <p>CO5: apply design rules.</p> <p>CO6: design various gates, adders, Multipliers, Memories, using stick diagrams, layouts.</p> <p>CO7: analyze the characteristics of CMOS circuit in comparing CMOS 2.5 micron process and emerging nanometer-scale electronic circuit technologies and processes.</p> <p>CO8: demonstrate semiconductor IC design such as PLA's, FPGAs and CPLDs.</p> <p>CO9: Be capable of designing and implementing combinational and sequential CMOS digital circuits and optimize them with respect to different constraints, such as area, delay, power, or reliability.</p> <p>CO10: design, simulate, and develop fabrication specs for CMOS VLSI digital circuits. CO11: Be capable of implementing a complete design verification process using computer automated tools for layout, extraction, simulation, and timing analysis.</p> <p>CO12: complete a significant VLSI design project having a set of objective criteria and design</p>

				constraints
	ECT18	MICROPROCES SOR AND INTERFACING	2017	<p>: Understand the basic microprocessors architecture and its functionality</p> <p>CO2: design and implement microprocessor based digital systems.</p> <p>CO3: make communication in between microprocessor based systems and peripherals. CO4:Develop the digital systems to perform real time applications by using microcontrollers</p>
	ECT19	MICROWAVE TECHNIQUES	2017	<p>CO1: apply knowledge of microwave engineering.</p> <p>CO2: design and construct experiments as well as to analyze and interpret the data of microwave experiments CO3: design mw transmitter And receiver system to meet desired needs within constraints such as economic, environmental, social, political, ethical and safety.</p> <p>CO4: function on multi- disciplinary teams.</p> <p>CO5: identify, formulate, and solve Mw engineering related problems. CO6: understanding of professional and ethical responsibility.</p> <p>CO7: communicate effectively CO8: the broad idea of microwave engineering to understand the impact of it in social context</p> <p>CO9: a recognition of the need for and an ability to engage in life long learning</p> <p>CO10: a knowledge of contemporary issues</p> <p>CO11: an ability to use the techniques, skills, and modernize mw engineering toolsnecessary for practice</p>
	ECT20	DIGITAL	2017	Analyze and process signals in the discrete domain

		SIGNAL PROCESSING		<p>CO2: Design filters to suit specific requirements for specific applications</p> <p>CO3: calculate discrete Fourier series, discrete Fourier transform</p> <p>CO4: apply properties of Fourier series, Fourier transform and FFT algorithms</p> <p>CO5: design various digital filters</p> <p>CO6: demonstrate on the concepts of multi rate signal processing and its applications. CO7: address the real time applications</p> <p>CO8: choose the best filter structure for implementation</p> <p>CO9: Understand the digital signal processing approach and digital filter with a computer based approach</p>
ECP07 IC	APPLICATIONS LAB	2017	<p>Able to design analog circuits such as Scalar, Adder, Comparator, and AC coupled amplifiers integrator and differentiator circuits using IC741.</p> <p>CO2: Able to design precision rectifiers, compare precision half wave and full wave rectifiers.</p> <p>CO3: Able to design and implement R-2R and weighted type DAC</p> <p>CO4: Able to analyze and design Astablemultivibrator using op-amp , low voltage variable regulator and waveforms generator IC 8038</p> <p>CO5: Able to design active I & II order low pass filters , Band pass filters and High pass filters</p>	
ECT21	RADAR ENGINEERING	2017	<p>: Should have the knowledge on principles and working of various radar systems and should be able to analyze various electronic equipments required for designing a radar depending upon the requirement.</p> <p>CO2: Expected to analyse the functioning of the radar system in reallife.</p> <p>CO3: Should be able to avoid difficulties arising due to various conditions while detecting a target. CO4: Should demonstrate the knowledge of how to track a particular target</p>	

				<p>CO5: Able to know how radar detects Doppler Frequency hence velocity of target</p> <p>CO6: Should be in position how the position of target(distance and angle)is determined. CO7: Able to know how the tracking of target is performed using radar.</p> <p>CO8: Able to know different components of radar system.</p> <p>CO9: Gains the knowledge of different direction finding techniques. CO10: Gains the Knowledge of errors in direction finding equipment.</p> <p>CO11: Able to know different equipment used navigational purpose at airports and in aeroplanes.</p>
	ECT22	OPTICAL COMMUNICATIONS	2017	<p>:Define basic optical laws and definitions.</p> <p>CO2: Classify fibers as single-mode, multimode step index and multi-mode graded index. CO3: Describe modes in multimode fibers and mode field parameter in single-mode fibers. CO4: Classify fiber optic cables and connectors.</p> <p>CO5: Explain the basis of signal degradation in optical fibers.</p> <p>CO6: Discuss the properties of light emitting diodes (LED) and laser diodes. CO7: Analyze power launching and coupling techniques for optical fibers. CO8: Describe the properties of PIN and Avalanche photodiodes.</p> <p>CO9: Analyze point-to-point fiber optic links.</p> <p>CO10: Explain different concepts and components of wave division multiplexing (WDM).</p> <p>CO11: List and explain the different applications of Optical Communications & design the</p>

				power budget with the given specifications
	ECT23	MOBILE COMMUNICAT IONS	2017	<p>: Independently understand concept of wireless communication.</p> <p>CO2: Understand and explain cellular concept.</p> <p>CO3: Understand the concept of mobile radio propagation.</p> <p>CO4: Identify the different types of propagation models for wireless communication. CO5: Explore the different modulation techniques.</p> <p>CO6: Design an equalizer for wireless communications. CO7: Design of speech encoders for mobile applications.</p> <p>CO8: Have a detailed knowledge of the mobile satellite systems and standards. CO9: Design wireless communication system</p> <p>CO10: To address the real time applications.</p>
	ECT24	COMMUNICAT ION NETWORKS	2017	<p>OSI model and TCP/IP and explain the function(s) of each Layer.</p> <p>CO2: Understand and explain Data Communications System and its components. CO3: Identify the different types of network topologies and protocols.</p> <p>CO4: Identify the different types of network devices and their functions within a network. CO5: Understand and building the skills of subnetting and routing mechanisms.</p> <p>CO6: Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.</p> <p>CO7: be familiar with several common programming interfaces for network communication;</p> <p>CO8: have a such as Broadcasting, Multicasting</p> <p>CO9: understand the key protocols that support the Internet</p>

				<p>CO10: develop a basic understanding of technologies and protocols used on the Internet, and how to effectively use Internet tools technologies including current web-based applications, e-mail, and social networking tools; developing searching strategies.</p> <p>CO11: Analyse the security requirements of a networked programming environment and identify the issues to be solved, assess security aspects in networking programs, come up with conceptual solutions to those issues;</p>
	ECP09	MICROPROCESSORS AND MICROCONTROLLERS LAB	2017	<p>Design and implement microprocessor, microcontroller based systems for various real time applications.</p> <p>CO2: interface microprocessor with various peripherals. CO3: design microcontroller based systems</p>
	ECP10	MICROWAVE AND OPTICAL COMMUNICATIONS LAB	2017	<p>know the klystron oscillator and Gunn diode oscillation characteristics</p> <p>CO3: have the knowledge of probe, loop slotted line etc.,</p> <p>CO4: know the relationship between Guide wavelength, free space wavelength and cut-off wavelength. CO5: Will be able to know tuning methods, both mechanical and electronic tuning practically.</p> <p>CO6: Have the knowledge of power coupling methods.</p> <p>CO7: know components like attenuator, isolators, short, matched termination etc., functioning.</p> <p>CO8: know different types of antennas, Horn antenna, microstrip antenna etc.</p> <p>the frequency meter functioning at microwave frequencies. CO10: know the knowledge in operation of VSWR meter.</p>

				know the knowledge of spectrum analyzer.
	ECP11	DIGITAL SIGNAL PROCESSING LAB	2017	Should able to find the convolution of sequence Able to design IIR and FIR filter Able to interrelate correlation and power spectral density
	ECP13	PROJECT WORK	2017	analyze a problem, identify and define the computing requirements appropriate to its solutions Shall be able to function effectively on teams to accomplish a common goal Shall be able to use current techniques, skill and tools necessary for computing practices to design and development principles in the construction of software systems of varying complexity Ability to communicate effectively understand the impact of engineering solutions in a global, economic, environment and social context. Knowledge of contemporary issues Ability to use the techniques ,skills and modern engineering tools necessary for engineering practice Ability to identify, formulate and solve engineering problems Understanding of professional and ethical responsibility Ability to function on multi-disciplinary teams Ability to design a system, component, or process to meet desired needs.

M.Tech ELECTRONICS AND COMMUNICATION ENGINEERING (Communication Systems)

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1.	ECCST 01	ADVANCED DIGITAL COMMUNICATION TECHNIQUES	2017	<ul style="list-style-type: none"> • Gain knowledge to map the vector concepts to signal space. • Able to design advanced digital modulation circuits in the area of BPSK, DPSK. • Capacity to design M-ary systems. • Analyze the channel coding aspects like linear block codes, cyclic codes and convolution codes. • Understand and analyze the broad band communication systems.
2.	ECCST 02: (Common to ECSPT 02	ADVANCED DIGITAL SIGNAL PROCESSING	2017	<p>Gain knowledge on Digital Systems.</p> <p>Ability to realize advanced FIR and IIR filter algorithms.</p> <p>Ability to implement fast algorithms in the area of Digital Signal Processing.</p> <p>Capability to analyze and implement the algorithms in finite word length systems.</p> <p>Able to apply Digital Signal Processing knowledge in specific domains</p>
3.	ECCST 03:	COMMUNICATION NETWORKS	2017	<p>Understand the various communication network topologies.</p> <ul style="list-style-type: none"> • Understand the Network layer concepts. • Ability to design a communication network. • Ability to incorporate protocols in computer communication networks.

				<ul style="list-style-type: none"> • Ability to apply security algorithms for communication network
4.	ECCST 04:	RADIATION SYSTEMS	2017	<p>Understand the basics of Electromagnetics for near and Far fields.</p> <ul style="list-style-type: none"> • Ability to understand and design Aperture Horn antennas. • Ability to analyze and design Microstrip antennas. • Ability to design phase antenna array and feeding mechanism. • Ability to understand and implement smart antennas for communication
5.	ECCST 07: (Common to ECSPT 14)	MODERN RADAR SYSTEMS	2017	<p>Understand the basics of RADAR configurations.</p> <ul style="list-style-type: none"> • Analyze the different RADAR detection techniques. • Acquaint with knowledge on RADAR system measurements and error analysis. • Gain knowledge on advanced RADAR configurations. • Gain knowledge on Electronic counter measures.
6.	ECCST 08:	ADAPTIVE ARRAYS	2017	<ol style="list-style-type: none"> 1. Understand the basics of various adaptive array systems. 2. Design and develop optimal arrays for different propagation conditions. 3. Analyze the various adaptive processing algorithms. 4. Understand and apply algorithms for non stationary environment. 5. Understand and apply optimization algorithms based on probability
7.	ECCST 21:	IMAGE AND VIDEO PROCESSING	2017	<p>Understanding the basic principles of Imaging.</p> <ul style="list-style-type: none"> • Gain knowledge of the images in transform domains. • Apply pre-processing algorithms on images and videos. • Understand and develop algorithms for image segmentation,

				<p>classification and interpretation.</p> <ul style="list-style-type: none"> • Develop various data reduction algorithms for images.
8.	ECCST 22:	MICROWAVE INTEGRATED	2017	<p>Develop parametric representation of two-port microwave networks.</p> <ul style="list-style-type: none"> • Able to design matching networks for Microwave circuits. • Ability to design of amplifiers at microwave frequencies. • Understanding and implementation of oscillators at microwave frequencies. • Designing circuits for frequency conversion in millimeter range.
9.	ECCST 23:	OPTICAL COMMUNICATIO N NETWORKS	2017	<p>Understand the mode theory in optics.</p> <ol style="list-style-type: none"> 2. Gain knowledge on fiber cables. 3. Analyze and design optical communication networks. 4. Gain knowledge on various components of optical fiber networks. 5. Gain knowledge on advanced optical networks
10.	ECCST 24:	WIRELESS COMMUNICATIO N	2017	<p>Understand the evolution of cellular systems.</p> <ol style="list-style-type: none"> 2. Design the link budget for wireless networks. <p>Understanding the channels in mobile communication.</p> <p>Develop equalization algorithms to combat channel effect.</p> <p>Gain knowledge on advanced wireless networks.</p>
11.	: ECCST 29:	RADAR SIGNAL PROCESSING	2017	<p>Know the fundamental concepts of radar signal processing and the concepts of matched filters.</p> <ol style="list-style-type: none"> 2. Familiarized ambiguity function and basic radar signals. 3. Acquired the knowledge about various codes and MTI.

				<p>4. Understand the advanced topics of synthetic aperture radar and synthetic aperture imaging.</p> <p>5. Analyzed various methods of detection and recognition</p>
12.	ECCST 35:	NEURAL AND FUZZY CONTROL SYSTEMS	2017	<p>Understand the Biological neural systems, construction of artificial neural systems and different learning rules.</p> <ul style="list-style-type: none"> • Acquired the knowledge about neural networks for non-linear systems and explored the neural network applications. • Independently understand the Fuzzy set theory and fuzzy set operations. • Gained the knowledge of the components and design,of fuzzy logic system. • Know about different adaptive fuzzy controllers
13.	ECCST 38: DSP	ALGORITHMS AND ARCHITECTURES	2017	<p>the architecture and programming of TMS320C67X Processors for real time applications.</p>
14.		SMART SENSORS	2017	<p>After successfully completing the course students will be able to Applications and selection of sensors/transducers for particular application..</p> <p>2. Describe the various types of sensors including thermal, mechanical, electrical, electromechanical and optical sensors.</p> <p>3. Select appropriate transducers and instrumentation system components for a specific application. Design and development of temperature/ pressure etc measurement systems.</p>

				<p>4. Select appropriate Switches and final control elements for a specific application.</p> <p>5. Selection of communication protocol and smart sensors for particular application.</p>
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M.Tech ELECTRONICS AND COMMUNICATION ENGINEERING

(Signal Processing)

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1.	ECSPT 01 (Common to ECCST 01)	ADVANCED DIGITAL COMMUNICATION TECHNIQUES	2017	<ul style="list-style-type: none"> • Gain knowledge to map the vector concepts to signal space. • Able to design advanced digital modulation circuits in the area of BPSK, DPSK. • Capacity to design M-ary systems. • Analyze the channel coding aspects like linear block codes, cyclic codes and convolution codes. • Understand and analyze the broad band communication systems.

2.	ECSPT 02: (Common to ECCST 02)	ADVANCED DIGITAL SIGNAL PROCESSING		Gain knowledge on Digital Systems. <ul style="list-style-type: none"> • Ability to design advanced FIR and IIR Digital filter algorithms. • Capability to implement fast algorithms in the area of Digital Signal Processing. • Ability to analyze and implement the algorithms in finite word length systems. • Able to apply Digital Signal Processing knowledge in specific domains.
3.	ECSPT 04: (Common to ECCST 08)	ADAPTIVE ARRAYS	2017	Understand the basics of various adaptive array systems. <ul style="list-style-type: none"> • Design and develop optimal arrays for different propagation conditions. • Analyze the various adaptive processing algorithms. • Understand and apply algorithms for non stationary environment. • Understand and apply optimization algorithms based on probability
4.	ECSPT 12: (Common to ECCST 03)	COMMUNICATIO N NETWROKS	2017	Understand the various communication network topologies. <ul style="list-style-type: none"> • Understand the Network layer concepts. • Ability to design a communication network. • Ability to incorporate protocols in computer communication networks. • Ability to apply security algorithms for communication network.
5.	ECSPT 14: (Common to	MODERN RADAR SYSTEMS	2017	Understand the basics of RADAR configurations. <ul style="list-style-type: none"> • Analyze the different RADAR detection techniques.

	ECCST 07)			<ul style="list-style-type: none"> • Acquaint with knowledge on RADAR system measurements and error analysis. • Gain knowledge on advanced RADAR configurations. • Gain knowledge on Electronic counter measures
6.	ECSPT 15: (Common to ECCST 04	RADIATION SYSTEMS	2017	<p>Understand the basics of Electromagnetics for near and Far fields.</p> <ul style="list-style-type: none"> • Ability to understand and design Aperture Horn antennas. • Ability to analyze and design Microstrip antennas. • Ability to design phase antenna array and feeding mechanism. • Ability to understand and implement smart antennas for communication.
7.	ECSPT 21: Common to ECCST 21)	IMAGE AND VIDEO PROCESSING (2017	<p>Understanding the basic principles of Imaging.</p> <ul style="list-style-type: none"> • Gain knowledge of the images in transform domains. • Apply pre-processing algorithms on images and videos. • Understand and develop algorithms for image segmentation, classification and interpretation. • Develop various data reduction algorithms for images
8.	ECSPT 22: (Common to ECCST 22)	MICROWAVE INTEGRATED CIRCUITS	2017	<ul style="list-style-type: none"> • Develop parametric representation of two-port microwave networks. • Able to design matching networks for Microwave circuits. • Ability to design of amplifiers at microwave frequencies. • Understanding and implementation of oscillators at microwave frequencies.

				<ul style="list-style-type: none"> • Designing circuits for frequency conversion in millimeter range.
9.	ECSPT 23: (Common to ECCST 29	RADAR SIGNAL PROCESSING	2017	<p>Know the fundamental concepts of radar signal processing and the concepts of matched filters.</p> <ul style="list-style-type: none"> • Familiarized ambiguity function and basic radar signals. • Acquired the knowledge about various codes and MTI. • Understand the advanced topics of synthetic aperture radar and synthetic aperture imaging. • Analyzed various methods of detection and recognition.
10.	ECSPT 33: (Common to ECCST 35)	NEURAL AND FUZZY CONTROL SYSTEMS	2017	<p>Understand the Biological neural systems, construction of artificial neural systems and different learning rules.</p> <ul style="list-style-type: none"> • Acquired the knowledge about neural networks for non-linear systems and explored the neural network applications. • Independently understand the Fuzzy set theory and fuzzy set operations. • Gained the knowledge of the components and design,of fuzzy logic system. • Know about different adaptive fuzzy controllers
11.	ECSPT 35: DSP (Common to ECCST 38	ALGORITHMS AND ARCHITECTURES	2017	<p>the architecture and programming of TMS320C67X Processors for real time applications.</p>

12.	ECSPT 36: (Common to ECCST 24	WIRELESS COMMUNICATIO N	2017	Understand the evolution of cellular systems. Design the link budget for wireless networks. Understanding the channels in mobile communication. Develop equalization algorithms to combat channel effect. Gain knowledge on advanced wireless networks.
13.	ECSPT 21: (Common to ECCST 21)	IMAGE AND VIDEO PROCESSING	2017	Understanding the basic principles of Imaging. Gain knowledge of the images in transform domains Apply pre-processing algorithms on images and videos Understand and develop algorithms for image segmentation, classification and interpretation Develop various data reduction algorithms for images.
14.	ECSPT 22: (Common to ECCST 22)	MICROWAVE INTEGRATED CIRCUITS	2017	Develop parametric representation of two-port microwave networks. <ul style="list-style-type: none"> • Able to design matching networks for Microwave circuits. • Ability to design of amplifiers at microwave frequencies. • Understanding and implementation of oscillators at microwave frequencies. • Designing circuits for frequency conversion in millimeter range.
15.	ECSPT 23: (Common to ECCST 29)	RADAR SIGNAL PROCESSING	2017	Know the fundamental concepts of radar signal processing and the concepts of matched filters. <ul style="list-style-type: none"> • Familiarized ambiguity function and basic radar signals. • Acquired the knowledge about various codes and MTI.

				<ul style="list-style-type: none"> • Understand the advanced topics of synthetic aperture radar and synthetic aperture imaging. • Analyzed various methods of detection and recognition.
16.	ECSPT 33: (Common to ECCST 35)	NEURAL AND FUZZY CONTROL SYSTEMS	2017	<ul style="list-style-type: none"> • Understand the Biological neural systems, construction of artificial neural systems and different learning rules. • Acquired the knowledge about neural networks for non-linear systems and explored the neural network applications. • Independently understand the Fuzzy set theory and fuzzy set operations. • Gained the knowledge of the components and design, of fuzzy logic system. • Know about different adaptive fuzzy controllers.
17.	ECSPT 35: ECCST 38)	DSP ALGORITHMS AND ARCHITECTURES (Common to	2017	the architecture and programming of TMS320C67X Processors for real time applications.
18.	ECSPT 36:	WIRELESS COMMUNICATIO N (Common to ECCST	2017	<p>Understand the evolution of cellular systems.</p> <p>Design the link budget for wireless networks.</p> <p>Understanding the channels in mobile communication.</p> <p>Develop equalization algorithms to combat channel effect.</p>

	24)		Gain knowledge on advanced wireless networks.
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45. M.Tech ELECTRICAL AND ELECTRONICS ENGINEERING

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1.	EEPSC 101A	COMPUTER METHODS IN POWER SYSTEMS	2017	Gain the knowledge on formation of suitable mathematical model of a given power system network Short circuit analysis and Load flow analysis. Select suitable method and mathematical model for short circuit and load flow studies Analyze the given power system network under normal and fault conditions
2.	EEPSC 102A	DIGITAL CONTROL SYSTEMS	2017	Acquire the knowledge of digital control system concepts. Design the digital control systems by applying Z-plane and state space analysis and conventional methods. Select and apply above techniques to realize the digital controllers
3.	EEPSC 103	ELECTRICAL POWER DISTRIBUTION	2017	Acquire In depth Knowledge on Load modeling and their characteristics

		SYSTEMS		<p>Distribution feeders and transformers</p> <p>Distribution Automation</p> <p>Faults and protection schemes.</p> <p>Design Distribution System with</p> <p>Optimum voltage drop and power loss</p> <p>Appropriate protection schemes</p>
4.	EE PSC 104	REACTIVE POWER CONTROL IN POWER SYSTEMS	2017	<p>Understand the significance of reactive power control in power systems to maintain quality of power</p> <p>Design appropriate control scheme to compensate reactive power and to filter harmonics.</p>
5.	EEPSE 101	RELIABILITY AND PLANNING OF POWER SYSTEMS	2017	<p>Acquire the knowledge of basic reliability concepts and planning aspects.</p> <p>Assess the generation capacity and stability of the system under various load conditions.</p> <p>Derive the mathematical model for the power systems and assess the reliability of the modeled power system.</p> <p>Apply the knowledge of reliability and planning concepts to the practical and real time systems.</p>
6.	EEPSE 102	ENERGY AUDITING, CONSERVATION &	2017	<p>Gain the knowledge on energy management, electrical and lighting energy management, role of energy manager, energy auditing, economical</p>

		MANAGEMENT		<p>and conservation schemes.</p> <p>Analyze energy saving opportunities, auditing and apply suitable methods to estimate the economic benefits of conservation, management and auditing of energy.</p>
7.	EE PSE 103	EHV AC TRANSMISSION	2017	<p>Understand the factors that decide rating of EHVAC Transmission.</p> <p>Calculate the Line & Zone parameters.</p> <p>Analyze the Effect of corona on various parameters such as power loss and Travelling waves.</p> <p>Analyze and design the compensating equipment's for different power frequency voltage control problems.</p>
8.	EEPSE 106	INTELLIGENT SENSORS AND TRANSDUCERS	2017	<p>Exhibit the knowledge in</p> <p>Smart Sensors(analog & Digital)</p> <p>Instrumentation amplifiers</p> <p>Interfacing of sensors with MCUs</p> <p>Apply to solve interfacing of sensors with amplifiers and MCU</p> <p>Understand Principles of interfacing D/A and A/D converters and apply to simple applications</p>
9.	EE PSE 107	PROCESS INSTRUMENTATION AND CONTROL	2017	<p>Learn about</p> <p>analog and digital conditioning</p> <p>Sensors and process control techniques</p>

				<p>Computer application in process control</p> <p>Analyze different methods of interfacing sensors with amplifiers and digital circuits</p> <p>Design signal conditioning and analog controllers for process control</p>
10.	EEPSC 201A	ADVANCED POWER SYSTEM PROTECTION	2017	<p>Understand various types of faults</p> <p>Protective schemes</p> <p>Power system protective equipment</p> <p>significance of relay testing and co-ordination</p> <p>Design and develop different protection schemes</p> <p>Select and apply different relays in real time power system protection</p>
11.	EE PSC 202A	OPTIMAL CONTROL THEORY	2017	<p>Demonstrate knowledge in</p> <p>Variational approaches to control systems</p> <p>Min/max principle</p> <p>dynamic programming application in control</p> <p>Analyze different solutions for minimizing performance measure</p> <p>Apply above principles for solving numerical problems in optimal control.</p>
12.	EEPSC 203	OPERATION & CONTROL OF INTERCONNECTED POWER SYSTEMS	2017	<p>Acquire knowledge on optimum operation and scheduling of thermal and hydel plants, unit commitment, load frequency control and automatic voltage generation.</p>

				<p>Solve economic dispatch, unit commitment, load frequency control and automatic voltage generation using conventional method</p> <p>Select and apply appropriate methods to operate inter connected power systems most economically and at constant frequency by optimum utilization of fuels at different loads.</p>
13.	EE PSC 204	POWER SYSTEM STABILITY	2017	<p>Gain the knowledge on Steady State, Transient and Voltage Stability aspects</p> <p>Select suitable method, mathematical model and tool for stability studies</p> <p>Analyze the given power system network with respect to stability point of view</p>
14.	EE PSE 203	FACTS AND CUSTOM DEVICES	2017	<p>CO-1 Acquire knowledge on:</p> <ul style="list-style-type: none"> Transmission line performance without FACTS. Transmission line performance with FACTS. Construction & operation characteristics of different FACTS. <p>CO-2 Acquire knowledge on:</p> <ul style="list-style-type: none"> Distribution line performance without Custom power. Distribution line performance with Custom power. Construction & operation characteristics of different Custom power devices.
15.	EE PSE	NEURAL AND FUZZY	2017	Demonstrate knowledge in:

	205	CONTROL SYSTEMS		<p>Neural networks and fuzzy logic</p> <p>Design of fuzzy controllers</p> <p>Adaptive fuzzy controllers.</p> <p>Apply fuzzy logic for designing of Fuzzy and adaptive fuzzy controllers for different real time systems</p>
16.	EE PSE 209	RENEWABLE ENERGY SOURCES	2017	<p>Gain knowledge on non-renewable sources like solar, biomass, wind energies</p> <p>Realize solar energy applications using photo voltaic cells</p> <p>Analyses biogas performance and testing</p>
17.	EEPSC 101B	COMPUTER METHODS IN POWER SYSTEMS Lab	2017	<p>Select and apply modern Engineering tools like MATLAB for solving Power System problems</p> <p>Analyze the power system network for different conditions</p>
18.	EEPSC 102B	DIGITAL CONTROL SYSTEMS Lab	2017	<p>Interpret and recall the basic mathematical operations</p> <p>Assess the different state space techniques</p> <p>Select and apply stability methods for digital control system</p>
19.	EE PSE 201A	ADVANCED POWER SYSTEM PROTECTION Lab	2017	<p>Conduct test on different types of electromechanical relays</p> <p>Conduct test on different types of micro-controller relays</p> <p>Find solutions for the numerical problems related to synchronous</p>

				machine dynamics
20.	EEPSC 202B	OPTIMAL CONTROL THEORY Lab	2017	Convert state space representation of the system into Jordan canonical form and test controllability and observability. Investigate the stability of a system by time domain and frequency domain methods
21.	EE PSE 209	SEMINAR	2017	prepare comprehensive report based on literature survey/Topics related to different subjects in the semester Identify the applicability of modern software tools and technology. Deliver presentation based on the preparation Answer queries posed by the listeners. Correct himself to improve presentation skills.
22.	EE PSE 209	COMPREHENSIVE VIVA	2017	Prepare comprehensively to answer questions from all the courses of two semesters. Attain Oral Presentation skills by answering questions in precise and concise manner. Gain confidence and inter-personal skills.
23.	EE PSE	PROJECT WORK	2017	Prepare comprehensive report based on literature survey.

	209			<p>Select a suitable problem relevant to power systems with an attention to real life problems faced by the society</p> <p>Find solution either through simulation or through practical work.</p> <p>Present the results from the work comprehensively through presentation.</p> <p>Present his/her work in a conference or publish the work in a peer reviewed journal</p>
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47. B.Tech MECHANICAL ENGINEERING

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1.	MAT01	ENGINEERING MATHEMATICS – I	2017	<p>CO1 Applying various statistical models and methods for drawing conclusions and making decisions under uncertainty in engineering contexts</p> <p>CO2 Apply statistical and numerical methods in various computer science related projects, seminars and research</p> <p>CO3 Apply the knowledge of iterative methods to solve</p>

				<p>algebraic and transcendental equations, simultaneous linear equations, ODE (ordinary differential equations)</p> <p>CO4 Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration</p> <p>Demonstrate a basic knowledge of the techniques for accurate and efficient solution of</p> <p>CO5</p> <p>models based on linear and nonlinear systems of equations, ordinary differential equations and partial differential equations</p>
2.	CST01	COMPUTER PROGRAMMING	2017	<p>Graduates will possess knowledge on mathematics, science and fundamental engineering concepts.</p> <p>The ability to design and develop applications, as well as to analyze and interpret data.</p> <p>The ability to function on multi-disciplinary areas and will be able to demonstrate with excellent programming, analytical, logical and problem solving skills.</p> <p>Graduates will demonstrate with an ability to develop, test and debug the software.</p> <p>Graduates will demonstrate with an ability to deploy, analyze,</p>

				troubleshoot, maintain, manage and secure the computer network.
3.	CET01	ENVIRONMENTAL STUDIES	2017	<p>Able to understand the importance of the environment</p> <p>Able to identify conservation concepts of natural resources</p> <p>Able to identify problems due to human interactions in the environment</p> <p>Able to understand the enforcement of environment acts in our constitution</p> <p>Capable of managing social issues related to environment</p>
4.	PHT01	ENGINEERING PHYSICS	2017	<p>Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.</p> <p>Ability to understand the crystal geometries and estimation of crystal structure by X- ray diffraction techniques.</p> <p>Students demonstrate the ability to identify and apply appropriate analytical and mathematical tools of physics in solving</p>

				<p>engineering problems.</p> <p>Student's ability to understand the principles in the production and applications of lasers and their effective utilization in optical communication and detection.</p> <p>Students poses the ability to understand size depended properties of nano dimensional materials and their effective utilization in making nano and micro devices for further microminiaturization of electronic devices.</p>
5.	CYT01	ENGINEERING CHEMISTRY	2017	<p>Students acquire the knowledge of with the preparation of various colloidal systems.</p> <p>Students will understand different principles involved in electrochemical processes and their importance in industry like electro deposition and electroplating etc.,</p> <p>Students will be able to understand different types of corrosion methods and their impact in metallic industry, boilers and furnaces.</p> <p>Students will be able to learn different types of hardness and its disadvantages in daily life and in industry.</p>

				It provides the classification and some polymerization methods
6.	MET 01	ENGINEERING GRAPHICS	2017	<p>Able to Select, Construct and Interpret appropriate drawing scale as per the situation.</p> <p>Able to draw simple curves like ellipse, cycloid and spiral.</p> <p>Able to draw projections of points and lines in any direction of plane.</p> <p>Able to draw projections of planes and solids in any direction of a plane.</p> <p>Draw orthographic projection of solids like cylinders, cones, prisms and pyramids including sections.</p>
7.	CSP01	COMPUTER PROGRAMMING LAB	2017	<p>The ability to design and develop applications, as well as to analyze and interpret data.</p> <p>Graduates will be able to demonstrate with excellent programming, analytical, logical and problem solving skills.</p> <p>Graduates will demonstrate with an ability to develop, test and debug the software.</p> <p>Graduates will demonstrate with an ability to deploy, analyze, troubleshoot, maintain, manage and secure the computer network.</p> <p>Graduates will be able to communicate effectively in both verbal and written forms.</p>

8.	MEP 01	WORKSHOP PRACTICE	2017	<p>Design and develop different types of wood joints based on the requirement</p> <p>Design and develop different types of fittings as per requirement</p> <p>Able to develop prototype models by using tin smithy tools.</p> <p>Design and develop different moulds as per practical requirements.</p> <p>Able to connect bulbs either series or parallel</p>
9.	MAT02	ENGINEERING MATHEMATICS – II	2017	<p>Use ranks of matrices to decide whether the system of linear equations is consistent or not and hence solve.</p> <p>Acquire knowledge about the physical interpretation of the gradient, divergence and curl.</p> <p>Able to know the basic results about the properties of Fourier transform and Fourier series and its convergence.</p> <p>Acquire the knowledge of properties of special functions and to use this to solve differential equations.</p> <p>Able to generate the functions of Legendre polynomials.</p>
10.	CST02	DATA STRUCTURES	2017	<p>Understand various algorithms for searching and sorting</p> <p>Design and implement data structures like arrays, stacks & queues</p> <p>Learning to use singly/doubly linked lists for efficient implementation of data structures</p>

				<p>Understanding the tree data structure, with focus on binary trees, binary search trees and height-balanced trees</p> <p>Understand data structures such as minimum spanning trees and graphs and also their applications in real world scenarios</p>
11.	EET01	BASIC ELECTRICAL ENGINEERING	2017	<p>Demonstrate and able to explain electrical components, electrical circuits and Kirchoff's laws.</p> <p>Acquire knowledge of DC circuit analysis, DC network theorems and their applications</p> <p>Formulate and solve complex AC, DC circuits.</p> <p>Understand the principles of operation of DC machines, single phase transformers and three phase induction motors</p> <p>Identify the starting methods of starting synchronous and induction motors and speed control methods for DC motors</p>
12.	ECT01	BASIC ELECTRONICS ENGINEERING	2017	<p>Characterize semiconductors, diodes, transistors and operational amplifiers</p> <p>Acquire the knowledge of amplifiers and oscillators</p> <p>Design simple combinational and sequential logic circuits</p> <p>Identify functions of digital multimeter, cathode ray oscilloscope and</p>

				<p>transducers in the measurement of physical variables</p> <p>Understand fundamental principles of radio communication</p>
13.	CET 41	ENGINEERING MECHANICS	2017	<p>Able to determine the resultant force and moment for a given force system</p> <p>able to determine the centroid and moment of inertia of composite sections</p> <p>Able to analyze stresses and strains of elastic and plastic materials in real life.</p> <p>Able to determine strains and temperature stresses in composite bars</p> <p>Able to analyze Gradual, sudden and impact loadings</p>
14.	ENT01	ENGLISH	2017	<p>Able to understand the use of English in everyday situations and contexts.</p> <p>Student will be in a position to face computer based competition exams like TOEFL.</p>

				<p>Able to communicate effectively and write accurately using English language.</p> <p>By the end of the course students will be able to graduate with good English competence</p> <p>Phonetics makes the students to pronounce accurately</p>
15.	CSP02	DATA STRUCTURES LAB	2017	<p>Acquire knowledge of various Methods and Notations for comparing the performance of various Data Structures.</p> <p>Acquire knowledge of development of linear data structures like stacks, Queues and their operations, Implementation using Arrays and Linked Lists.</p> <p>Acquire knowledge of properties of Binary Search Trees, balanced binary search trees, Splay Trees, Red Black Trees, AVL Trees and their implementation</p> <p>Acquire knowledge of efficient external searching techniques using Indexing, Hashing.</p> <p>Acquire knowledge of indexing implementation in B-Trees and B+ Trees</p>
16.	ENP01	ENGLISH COMMUNICATION	2017	<p>Better pronunciation and accent</p> <p>Ability to use functional English</p>

		LAB		<p>Competency in analytical skills and problem solving skills</p> <p>Increase possibilities of job prospects</p> <p>Communicate confidently in formal and informal contexts</p>
17.	MAT 03	ENGINEERING MATHEMATICS – III	2017	<p>Applying various statistical models and methods for drawing conclusions and making decisions under uncertainty in engineering contexts</p> <p>Apply statistical and numerical methods in various computer science related projects, seminars and research</p> <p>Apply the knowledge of iterative methods to solve algebraic and transcendental equations, simultaneous linear equations, ODE (ordinary differential equations)</p> <p>Acquire knowledge of finite differences, interpolation, numerical differentiation and numerical integration</p> <p>Demonstrate a basic knowledge of the techniques for accurate and efficient solution of models based on linear and nonlinear systems of equations, ordinary differential equations and partial differential equations</p>
18.	CET 42	MECHANICS OF SOLIDS	2017	<p>Able to select materials, types and allowances of patterns and analyze the components of moulds, gating system in metal casting</p>

				<p>processes.</p> <p>Develop process-maps for metal working processes using plasticity principles</p> <p>Able to analyze Hot and Cold Working, Forging, Extrusion and Drawing Processes</p> <p>Design and Analyze different sheet metal working processes</p> <p>Understand different Welding and joining processes and its defects</p>
19.	FEC 01	PROFESSIONAL ETHICS	2017	<p>Able to distinguish among morals, values, ethics, and the law and to explore how they each impacts professional practice.</p> <p>Understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field.</p> <p>Apply creative thinking to solve ethical problems in business setting and develop analytical thinking skills necessary to successfully manage ethical decisions and dilemmas.</p> <p>Aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.</p> <p>Able to know doing the things right in various issues of research and</p>

				experimentation in ethical manner.
20.	MET 02	THERMODYNAMICS	2017	<p>Understand the concepts of continuum, system, control volume, thermodynamic properties, thermodynamic equilibrium, work and heat.</p> <p>Apply various laws of thermodynamics to various processes and real systems.</p> <p>Apply the concept of Entropy, Calculate heat, work and other important thermodynamic properties for various ideal gas processes.</p> <p>Estimate performance of various Thermodynamic gas power cycles and gas refrigeration cycle and availability in each case</p> <p>Able to find out calorific value of fuels and analyze the chemical analysis from experimentation</p>
21.	MET 03	ADVANCED ENGINEERING GRAPHICS	2017	<p>Able to draw Projections of solids and Auxiliary projections of solids parallel to one plane perpendicular to both the planes</p> <p>Able to analyze and draw section of solids inclined to both the planes</p> <p>Able to develop surfaces of solids which are perpendicular to both</p>

				<p>the planes</p> <p>Able to draw interpretation of solids in any angle</p> <p>Able to draw isometric projections of simple objects</p>
22.	MET 04	MANUFACTURING PROCESSES	2017	<p>CO1</p> <p>Able to select materials, types and allowances of patterns and analyze the components of moulds, gating system in metal casting processes.</p> <p>CO2</p> <p>Develop process-maps for metal working processes using plasticity principles</p> <p>CO3</p> <p>Able to analyze Hot and Cold Working, Forging, Extrusion and Drawing Processes</p> <p>CO4</p> <p>Design and Analyze different sheet metal working processes</p>

				<p>CO5</p> <p>Understand different Welding and joining processes and its defects</p>
23.	CEP 41	MECHANICS OF SOLIDS LAB	2017	<p>Analyze the behavior of the solid bodies subjected to various types of loading.</p> <p>Apply knowledge of materials and structural elements to the analysis of simple structures.</p> <p>Undertake problem identification, formulation and solution using a range of analytical methods.</p> <p>Analyze and interpret laboratory data relating to behavior of structures and the materials they are made of, and undertake associated laboratory work individually and in teams.</p> <p>Expectation and capacity to undertake lifelong learning.</p>
24.	MEP 02	MANUFACTURING PROCESSES LAB	2017	<p>To impart knowledge of different types of machine tools and their constructional details like lathe, milling and shaping machines.</p> <p>Able to develop knowledge about types of cutting tools, single point and multi point cutting tool and the manufacture of these tools, the speeds at which a</p>

				<p>specific type of tool will machine a particular type of material.</p> <p>Acquire knowledge about coolants and lubrication, their use and purpose while machining.</p> <p>Able to analyze different types of cutting tools, single point and multi point cutting tool</p> <p>and the manufacture of these tools, the speeds at which a specific type of tool will machine a particular type of material.</p> <p>Able to perform different operations on lathe, milling and shaping by conducting experiments on these machine tools.</p>
25.	EOT 01	MANAGERIAL ECONOMICS	2017	<p>Analyze the demand and supply conditions and assess the position of a company</p> <p>Design competition strategies, including costing, pricing, product differentiation, and</p> <p>market environment according to the natures of products and the structures of the markets.</p> <p>Assess the relationships between short-run and long-run costs.</p> <p>Appraise some of the current and emerging issues in managerial economics at the national and international levels.</p> <p>Explain four different pricing practices such as discrimination, two part pricing, block pricing, commodity bundling, transfer pricing,</p>

				and peak load pricing
26.	MET 05	KINEMATICS OF MACHINERY	2017	<p>Understand the principles of kinematic pairs, chains and their classification, DOF, inversions, equivalent chains and planar mechanisms.</p> <p>Acquire knowledge and develop straight line motion mechanisms and steering mechanisms.</p> <p>Able to draw velocity and acceleration diagrams for different mechanisms</p> <p>Able to design and develop gear and gear train depending on application.</p> <p>Design cams and followers for specified motion profiles.</p>
27.	MET 06	THERMAL ENGINEERING	2017	<p>Explore their knowledge & ability to design the constructional features of various types of boilers in various fields of energy transfer equipments.</p> <p>Knowledge of impact of engineering solutions on the society and also on contemporary issues related to different types of steam cycles and propulsion systems.</p> <p>Able to demonstrate and understanding of the main factors, performance and governing of steam engines.</p>

				<p>Design nozzles and condensers with desired needs within realistic constraints such as</p> <p>economic, environmental, social, political, ethical, and safety manufacturability and sustainability related thermal fields like different types of power plants etc.</p> <p>Design turbines with desired needs within realistic constraints such as economic,</p> <p>environmental, social, political, ethical, and safety manufacturability and sustainability related thermal fields like different types of power plants etc.</p>
28.	MET 07	MACHINE TOOLS AND METAL CUTTING	2017	<p>Understand the cutting tool geometry, mechanism of chip formation and mechanics of orthogonal cutting.</p> <p>Identify basic parts and operations of machine tools including lathe, shaper, planer and slotter machines</p> <p>Able to know the various operations performed on drilling, drill press and milling machines and also know the nomenclature of cutters.</p> <p>Able to select appropriate machining processes and conditions on behalf of different metals</p> <p>for a specific application in real time.</p> <p>Able to understand the need and applications of modern machining</p>

				processes in real life.
29.	CET 43	Fluid Mechanics and Hydraulic Machinery	2017	<p>Able to gain basic knowledge on Fluid Statistics, Fluid Dynamics, closed conduit flows.</p> <p>Ability to analyze fluid flow problems with the application of the momentum and energy equations and compute drag and lift coefficients using the theory of boundary layer flows.</p> <p>Able to know the applications of momentum principles in all power plants.</p> <p>Acquire knowledge on the selection of hydraulic turbines for practical purposes and also able to prepare prototype models.</p> <p>Able to have thorough knowledge on selection of pumps for practical purposes.</p>
30.	MET 08	MACHINE DRAWING	2017	<p>Draw orthographic projections of lines, planes and solids</p> <p>Identify and design different machine elements for joining purposes</p> <p>Identify and draw the couplings and riveted joints</p>

				<p>able to construct an assembly drawing using part drawings of machine components</p> <p>Able to construct an part drawings using assembly drawing of machine components</p>
31.	CEP 42	Fluid Mechanics and Hydraulic Machinery Laboratory	2017	<p>Able to utilize the knowledge in the design of water supply pipe networks and measure the rate of flow in pipes and channels.</p> <p>Able to identify suitable pumps and turbines for different working conditions.</p> <p>Able to conduct experiments (in teams) in pipe flows and open-channel flows and interpreting data from model studies to prototype cases, as well as documenting them in engineering reports</p> <p>Analyze a variety of practical fluid-flow devices and utilize fluid mechanics principles in design</p> <p>Gain exposure to modern computational techniques in fluid dynamics.</p>
32.	EEP 43	ELECTRICALS ENGINEERING LABORATORY	2017	<p>Understand the construction, operating principle and characteristics of DC machine, single phase transformer and three phase induction motor.</p>

				<p>Prepare circuits for starting and speed control of DC machine and three phase induction motor.</p> <p>Learn the basic principles involved in power generation, transmission & distribution.</p> <p>Ability to understand and analyze DC Generator</p> <p>Able to verify the electrical circuits and perform tests on various devices.</p>
33.	ECP 42	ELECTRONICS ENGINEERING LABORATORY	2017	<p>Able to explain the characteristics of semiconductor devices</p> <p>Describe Architecture, Programming & Interfacing of peripheral with</p> <p>Microprocessor.</p> <p>Design different electronics circuits using amplifiers and oscillators.</p> <p>Demonstrate different applications of diode- clipper, clamper, full wave rectifier and half wave rectifier</p> <p>Able to explain operation and characteristics of JFET & BJT and analyze simple circuits</p>
34.	COT	MANAGERIAL	2017	Accounting records and summarize and interpret the accounting

	02	ACCOUNTANCY		<p>data for managerial decisions.</p> <p>Critically analyze information pertaining to accounting, management, ethical, and social issues to assist management decision making.</p> <p>Cost management ideas in determining product/service costs and in making business decisions, with an emphasis on Activity-based Costing.</p> <p>Cost accounting terminologies and methods, their rationale of classification, and their relevance to business decisions.</p> <p>Ideas and practices of budgeting in a business decision-making context, with an emphasis on flexible budgeting, standard costing, variance analysis, and performance management, and their inherent problems.</p>
35.	MET 09	MECHNAICAL MEASURMENTS AND METROLOGY	2017	<p>Measurements, and understand the principle of operation of an instrument, Choose Suitable measuring instruments for a particular application and Apply ethical principles while measuring dimensions.</p> <p>CO2</p>

				<p>Principles of instrumentation for transducers & measurement of non-electrical parameters like pressure and vacuum in mechanical engineering applications for sustainable development.</p> <p>CO3 Principles of limits, fits, tolerance and analyze the process alignment testing of machine tools for manufacturing field.</p> <p>CO4 Use instruments for linear and angular measurement</p> <p>CO5 Measurement methods and instruments, both traditional and modern that is used in the industry to measure product dimensions, shape and surface structure</p>
36.	MET 10	DYNAMICS OF MACHINERY	2017	<p>Analyse and design clutches, brakes and dynamometers.</p> <p>CO2 Gyroscopic effects in ships, aero planes, road vehicles and characterize & design flywheels of an IC Engine.</p> <p>CO3 Analyse and design centrifugal governors.</p>

				<p>CO4 Analyse balancing problems in rotating and reciprocating machinery</p> <p>CO5 Free and forced vibrations of single degree freedom systems</p>
37.	MET 11 IC	ENGINES AND GAS TURBINES	2017	<p>CO1 Identify various types of I.C. Engines and fuel metering and supply systems.</p> <p>CO2 engine performance and understand normal and abnormal combustion phenomena in SI and CI engines effect of various operating variables.</p> <p>CO3 Construction, working of various types of reciprocating and rotary Compressors with performance calculations of positive displacement compressors.</p> <p>CO4 Applications of turbo machines for enabling a sustainable society.</p>

				<p>CO5 Essential components of gas turbine along with its performance improving methods and know the different types of Jet propulsive engines and Rockets.</p>
38.	MET 12	MATERILS SCIENCE AND METALLURGY	2017	<p>Analyze the Structure of materials at different levels, basic concepts of crystalline materials like unit cell, FCC, BCC, HCP, APF (Atomic Packing Factor), Co- ordination Number etc.</p> <p>CO2 Understand concept of mechanical behavior of materials and calculations of same using appropriate equations Able to explain the concept of phase & phase diagram & understand the basic</p> <p>CO3</p> <p>terminologies associated with metallurgy. Construction and identification of phase diagrams and reactions</p> <p>CO4 Able to produce materials by using different types of production processes and know the real life applications in practical</p>

				<p>cases.</p> <p>Able to construct TTT diagrams and cooling curves and understand and suggest the</p> <p>CO5</p> <p>heat treatment process & types. Significance of properties Vs microstructure. Surface hardening & its types</p>
39.	MET 13	DESIGN OF MACHINE MEMBERS –I	2017	<p>Customers’ need, formulate the problem and draw the design specifications</p> <p>CO2 Select components as per standards and Understand component behavior subjected to loads and identify the failure criteria</p> <p>CO3 To design a machine component in fluctuating loads</p> <p>CO4 Design fasters for different mechanical purposes and identify welded joints and their failure</p> <p>CO5 Design and analyze springs</p>
40.	MEP	MACHINE TOOLS	2017	Forces, can control appropriateness for machine power according to

	03	LABORATORY		<p>working standards</p> <p>CO2 Produce single point cutting tools as per standards</p> <p>CO3 Conduct different machine alignment tests on lathe and drilling machines</p> <p>CO4 Tool wear and indexing</p> <p>CO5 Measurement of forces milling machine and analyze the impact strength of welded joints</p>
41.	MEP 04	FUELS LAB	2017	<p>Analyze important fuel and lubricant properties for the application in specific exploitation conditions</p> <p>Measure flash and fire point of different fuels</p> <p>Able to calibrate the pressure gauges</p> <p>Able to measure performance of a centrifugal blower</p> <p>Able to know the working of different boilers in steam power plant</p>
42.	MET 14	REFRIGERATION AND AIR CONDITIONING	2017	<p>Able to recognize the fundamental principles of and locate various important components of the refrigeration and air conditioning system.</p> <p>Have a good understanding of the principles of air conditioning design, and consideration that influence the design including human comfort, weather and environmental parameters and building</p>

				<p>structure</p> <p>Comparative study of different refrigerants with respect to properties, applications and environmental issues.</p> <p>Able to develop analytical cognitive skills and improve problem solving skills in air conditioning.</p> <p>Acquire knowledge of heating, ventilation, and air conditioning and refrigeration controls and technical components for optimum performance.</p>
43.	MET 16	DESIGN OF MACHINE MEMBERS – II	2017	<p>CO1 Design keys, cotters, couplings and joints including riveted, bolted and welded joints. CO2 Analyze the pressure distribution and design journal bearings.</p> <p>CO3 Analyze the dynamic loads and design of rolling contact bearings. CO4 Design different types of gears</p> <p>CO5 Design belts, springs, brakes, clutches and engine parts</p>
44.	MET 17	INDUSTRIAL ENGINEERING AND MANAGEMENT	2017	<p>Evolutionary development of management thought and general principles of management. CO2 Identify and design plant location, plant layout and material handling systems</p> <p>CO3 Forecasting and PPC techniques to production systems</p>

				<p>CO4 Reduce work duration in industries using work and time study</p> <p>CO5 Suggest safety techniques for industries and know the concepts of factories ACTs.</p>
45.	MEP 05	I.C.ENGINES LAB	2017	<p>CO1 Conduct constant speed and variable speed tests on IC engines and interpret their performance.</p> <p>CO2 Estimate energy distribution by conducting heat balance test on IC engines</p> <p>CO3 Evaluate the performance of turbo machines</p> <p>CO4 Evaluate the performance of air compressor and blower</p> <p>CO5 Able to draw valve timing and port timing diagrams of Petrol & Diesel engines.</p>
46.	MEP	METROLOGY LAB	2017	Prepare setups and measure dimensional and geometrical features of

	06			<p>components. CO2 Measure surface roughness of components.</p> <p>CO3 Able to do alignment tests</p> <p>CO4 Able to calibrate different mechanical instruments for general purposes</p> <p>CO5 Gain knowledge on different setups for measuring thread profile</p>
47.	MEOE 01	PROJECT MANAGEMENT	2017	<p>CO1 Improving knowledge and understanding of project management principles.</p> <p>CO2 Develop strategies to initiate, plan, execute, monitor and control, and close projects in business environments.</p> <p>Conduct project planning activities that accurately forecast project costs, timelines,</p> <p>CO3</p> <p>and quality. Implement processes for successful resource, communication, and risk and change management.</p>

				<p>CO4 Utilize technology tools for communication, collaboration, information management, and decision support.</p> <p>CO5 Analyzes and manages stakeholder expectations and engagement to ensure a successful project outcome in future.</p>
48.	MEOE 02	GREEN ENERGY SYSTEMS	2017	<p>CO1 Instruments for measuring solar radiation and analyze the solar radiation data.</p> <p>CO2 Principles and applications of solar energy, solar energy collection, solar heating, solar distillation and photo voltaic energy.</p> <p>CO3 Geothermal, Wind & Tidal energy, its mechanism of production and its applications</p> <p>CO4 Concept of Biomass energy resources and their classification, types of biogas Plants- applications</p> <p>CO5 Design environmental friendly buildings through industrial wastes and natural materials</p>
49.	MEOE 03	INDUSTRIAL ROBOTICS	2017	Analyze the manipulator design including actuator, drive and sensor

				<p>issues</p> <p>The different types of control systems, drive mechanisms and select appropriate drive system as per industry requirements and also apply various controls as per requirement.</p> <p>Identify different types of end effectors and sensors required for specific applications</p> <p>Develop programming principles and languages for a robot control system.</p> <p>Select an appropriate robot for given industrial inspection and material handling systems.</p>
50.	MEDE 01	MECHANICAL VIBRATIONS	2017	<p>Motion and the natural frequency of a freely vibrating single degree of freedom undamped motion and a freely vibrating single degree of freedom damped motion.</p> <p>CO2 Ability to determine vibratory responses of SDOF, TDOF and MDOF systems to harmonic, periodic and non-periodic excitation.</p>

				<p>CO3 Calculate natural frequency and period of simple vibrating mechanical systems.</p> <p>CO4 Represent the vibration phenomena as a mathematical model and solve it to obtain the response.</p> <p>CO5 Process of vibration measurements & control and vibration continue systems.</p>
51.	MEDE 02	ADVANCED MANUFACTURING PROCESSES	2017	<p>CO1 Analyze the different elements and characteristics of Abrasive jet machining and Ultrasonic Machining and its applications.</p> <p>CO2 Implement the chemical and electro chemical machining techniques.</p> <p>Understand the working of electric discharge machining and process of beam control</p> <p>CO3</p> <p>techniques of EBM affecting the surface finish of work pieces in medical and engineering fields.</p>

				<p>CO4 Implement plasma arc and Laser beam machining processes for industrial applications.</p> <p>CO5 To have exposure to recent developments in composites, including metal, polymer and ceramic matrix composites</p>
52.	MEDE 03	NON- CONVENTIONAL ENERGY SOURCES	2017	<p>CO1 Various non-conventional sources of energy like wind, biomass etc and its applications in remote areas of the country.</p> <p>CO2 Instruments for measuring solar radiation and analyze the solar radiation data.</p> <p>CO3 Principles and applications of solar energy, solar energy collection, solar heating, solar distillation and photo voltaic energy.</p> <p>CO4 Geothermal, Wind & Tidal energy, its mechanism of production and its applications</p> <p>CO5 Concept of Biomass energy resources and their classification, types of biogas Plants- applications</p>
53.	MET 18	ANALYSIS AND CONTROL OF	2017	<p>CO1 Production systems and their characteristics. CO2 Identify and design facility location and layout CO3 Analyze</p>

		PRODUCTION SYSTEMS		<p>aggregate planning strategies.</p> <p>CO4 Apply forecasting and scheduling techniques to production systems.</p> <p>CO5 Develop network diagrams for planning and execution of a given project</p>
54.	MET 19	TOOL DESIGN	2017	<p>Design single point and multipoint cutting tools</p> <p>CO2 Tool wear using different techniques and also select cutting fluids to reduce the heat</p> <p>CO3 Select cutting tool materials for different operations</p> <p>CO4 Select and design progressive, compound or combination dies for press working operations</p> <p>CO5 Design jigs and fixtures for conventional and Understand principles of locating and clamping systems.</p>
55.	MET	AUTOMOBILE ENGINEERING	2017	<p>Concepts of different types of engines and their parts</p>

	20			<p>CO2 Select air cleaners and carburetors for petrol and diesel engines</p> <p>CO3 Knowledge on cooling systems, lubrication systems and ignition systems of SI and CI engines</p> <p>CO4 Design clutches and gear boxes for small vehicles</p> <p>CO5 Select different steering mechanisms and brakes for smooth moving of vehicle</p>
56.	MET 21	FINITE ELEMENT METHOD	2017	<p>Interpret the philosophy behind principles, design and modelling considerations in using finite element analysis.</p> <p>Able to apply suitable boundary conditions to a global equation for bars, trusses,</p> <p>CO2</p> <p>beams, circular shafts, heat transfer, fluid flow, axi symmetric and dynamic problems and solve them displacements, stress and strains induced.</p> <p>CO3 Implement the formulation techniques to solve two-</p>

				<p>dimensional problems using triangle and quadrilateral elements.</p> <p>CO4 Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.</p> <p>CO5 Able to simulate simple CFD models and analyze its results.</p>
57.	MET 22	HEAT TRANSFER	2017	<p>CO1 Understand principles of different modes of heat transfer processes.</p> <p>CO2 Formulate and solve conduction and convective heat transfer problems. CO3 Estimate and solve radiation problems of black, gray and opaque bodies. CO4 Understand current challenges in the field of convective heat transfer.</p> <p>CO5 Evaluate energy requirements for operating a flow system with heat exchanger.</p>
58.	MEP 07	HEAT TRANSFER AND DYNAMICS LAB	2017	<p>CO1 Estimate heat transfer coefficient in forced convection.</p> <p>CO2 Measure heat transfer coefficient in free convection and correlate with theoretical values.</p> <p>CO3 Estimate the effective thermal resistance in composite slabs and efficiency in pin- fins.</p> <p>CO4 Determine surface emissivity of a test plate. CO5 Able</p>

				to design refrigeration and control systems
59.	ECP 43	MAT LAB	2017	<p>Use MATLAB effectively to analyze and visualize data.</p> <p>CO2 Apply numeric techniques and computer simulations to solve engineering-related problems.</p> <p>CO3 Apply a top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives.</p> <p>CO4 Design and document computer programs and analyses in a careful and complete manner so as to effectively communicate results, to facilitate evaluation and debugging by another programmer, and to anticipate and resolve user errors.</p> <p>CO5 Create and control simple plot and user-interface graphics objects in MATLAB.</p>
60.	MEOE 04	QUALITY CONTROL AND RELIABILITY ENGINEERING	2017	<p>Acquire knowledge on basic concepts of quality control and different types of control charts</p> <p>CO2 Graduates will be aware of process capabilities in assemblies and able to select control limits.</p> <p>CO3 Gain insight knowledge on consumer risks and effectively generate sampling plans.</p> <p>CO4 An ability to use the techniques,skills, and modern engineering tools necessary for</p>

				<p>Quality Control and Reliability Engineering.</p> <p>CO5 Acquire knowledge on TQM, six sigma concepts and ISO standards</p>
61.	MEOE 05	POWER PLANT ENGINEERING	2017	<p>Able to know the different types of Power Plants, site selection criteria of each one of them.</p> <p>CO2 Able to select boilers, ash handling systems, draft systems and water treatment process for industrial needs.</p> <p>CO3 Understand the construction and working of steam turbines, condensers, cooling towers and governing systems.</p> <p>CO4 Able to design feed water system accessories and choose appropriate instruments for measuring the flow, temperature, etc.</p> <p>CO5 Acquire knowledge of Different types of Nuclear power plants including Pressurized water reactor, boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor.</p>
62.	MEOE 06	ENGINEERING SYSTEM ANALYSIS AND DESIGN	2017	<p>Able to gather data to design and analyze the requirements of system components and environments.</p> <p>CO2 An ability to analyze a problem, and identify corresponding networking techniques to get appropriate solution</p> <p>CO3 An ability to design, implement, and evaluate a computer-based management system, process, component, or program to meet desired needs</p> <p>CO4 Able to apply the object-oriented approach to systems</p>

				<p>development and become functionally knowledgeable of UML modeling techniques and tools</p> <p>CO5 Successfully tackle mini-cases and respond to real-life ethical issues in engineering systems.</p>
63.	MET 23	CAD AND CAM	2017	<p>Be familiar with drawing of 2-D entities like lines, rectangle, Parallelogram polygon, circle etc., under Draw tools entity menu using CAD software.</p> <p>. Be able to draw 2-D models (Using Modify tools such as Erase, copy, offset, etc., commands)</p> <p>Be able to understand the concept of Rectangular ARRAY and Polar ARRAY</p> <p>They will be exposed to general principles and applications of geometric modeling. obj.5. To provide information about CADD industry resources.</p>
64.	MEP 08	CAD AND CAM LAB	2017	<p>CO1 Draw complex geometries of machine components in sketcher mode.</p> <p>CO2 Create complex engineering assemblies using appropriate assembly constraints. CO3 Develop G and M codes for turning and milling components.</p> <p>CO4 Generate automated tool paths for a given engineering</p>

				component. CO5 Generate automated tool paths for a given engineering component
65.	MEDE 04	MECHATRONICS	2017	<p>Able to know the need and importance of Electronics for Mechanical Engineer and Mechanical systems for Electronic Engineer.</p> <p>Able to classify various sensors, transducer and actuators according to the applications.</p> <p>Ability to design basic control systems using different actuators.</p> <p>Able to understanding of PLC programming and selection of appropriate PLC for industrial needs.</p> <p>Acquire knowledge on various applications of design of mechatronic systems in real world problems.</p>
66.	MEDE 05	ROBOTICS	2017	<p>Able to demonstrate the basic functioning and identifying of various components of robots</p> <p>Able to understand the different types of control systems, drive mechanisms and select appropriate drive system as per industry</p>

				<p>requirements and also apply various controls as per requirement.</p> <p>Able to carry out kinematic analysis, workspace analysis and trajectory planning for a robot and also identify suitable sensors/actuators and grippers for robots</p> <p>Able to select an appropriate robot for given industrial inspection and material handling systems.</p> <p>Plan, design and implement robotic systems, algorithms and software capable of operating in complex and interactive environments.</p>
67.	MEDE 06	NANOTECHNOLOGY	2017	<p>Integrate a deep and comprehensive understanding of nanoscale phenomena and material properties with core principles and concepts in chemistry, physics, engineering and mathematics.</p> <p>Evaluate and analyze the mechanical properties of bulk nanostructured metals and alloys, nanocomposites and carbon nanotubes.</p> <p>Exhibit integrated knowledge in the structure of matter at the nanoscale and the technological elements of the physical, chemical and bio-related properties of materials.</p> <p>Able to discuss ethical issues relevant to nano biotechnology and nano medicine.</p> <p>Build nonmaterial's using nanofabrication techniques, including top-</p>

				down and bottom- up approaches.
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M.Tech MECHANICAL ENGINEERING

(Industrial Engineering)

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1.	MAME T01	APPLIED PROBABILITY AND STATISTICS	2017	Basic concepts of sampling applied in population enumeration. 2. Regression techniques for application and forecast the demand and related variables 3. Testing of hypothesis using statistical distributions. 4. Correlation between the observed values and experimental values for analysis of variance.
2.	MEIE T01	OPERATION RESEARCH	2017	Procedures to model and solve the LPP problems. 2. The design and implementation of the Project Planning. 3. Concepts of queuing systems in real life situations and model for analysis. 4. Importance of the collaboration with industrial projects with involvement of both written and PPT presentations. 5. Estimate the time for shortest path in project scheduling so as to allocate the resources and minimize the make span

3.	MEIE T02	WORK SYSTEM DESIGN	2017	<p>Work study principle and design effective work layout for minimal hand and body motions.</p> <ol style="list-style-type: none"> 2. Design process for improvement and design the method study. 3. Estimation of time for each operation through micro motion study so as to eliminate unnecessary movements. 4. Design the ergonomics for effective usage of hand and body motions
4.	MEIE T03	OPERATIONS PLANNING AND CONTROL	2017	<p>Forecasting principles and techniques for short range and long range planning</p> <ol style="list-style-type: none"> 2. Production requirements for each product and plan the shop floor activities 3. Work station loading and scheduling of paths to avoid bottle necks for smooth production 4. Solution for product mix decision using OR techniques. 5. Optimal job sequences to achieve the minimum make span with maximum production output
5.	MEIE P01	COMPUTATIONAL LABORATORY	2017	<p>To pursue the method adopted in performing the operation.</p> <ol style="list-style-type: none"> 2. Understanding of reliable and flexible method to accomplish hectic task in minimum possible time. 3. To record the human activities during working conditions using scientific methods. 4. To study the performance rating of individual worker and to

				<p>cost accordingly</p> <p>5. Development of new techniques to minimize the bottlenecks</p>
6.	MEIE T04	SUPPLY CHAIN MANAGEMENT	2017	<p>Managerial decision plans for effective implementation with competitive supplies</p> <p>2. Demand of the materials and maintain zero inventories with proper supply chain.</p> <p>3. Manufacturing operations and allocation of resources for optimal production.</p> <p>4. Proper sales market so as to plan the MRP and lean manufacturing concepts</p> <p>5. Logistics for purchasing raw materials and maintain continuous chain with suppliers and customers</p>
7.	MEIE T05	QUALITY CONTROL AND RELIABILITY ENGINEERING	2017	<p>Able to maintain quality in products using quality circle principles.</p> <p>2. Able to apply statistical methods to accept the lot of samples.</p> <p>3. Able to increase the reliability of product through statistical approach.</p> <p>4. Able to judge whether the lots of samples are to be accept or reject.</p> <p>5. Learn fundamentals of reliability management and risk assessment</p>
8.	MEIE T06	HUMAN RESOURCE	2017	<p>Critically evaluate and apply theories and models of HRM that explain the nature and significance of key HRM practices and</p>

		MANAGEMENT		<p>HRM outcomes as they relate to diverse organisational contexts.</p> <p>2. Critically analyse and apply the emerging strategic role that HRM plays in a changing business environment and workplace to maintain current policies and procedures</p> <p>3. Analyse and align HR systems and processes to leadership strategies and objectives in contemporary organisations to promote best practice in HR performance.</p> <p>4. Identify and evaluate key organisational approaches to improving HR outcomes for both the organisation and its employees</p> <p>5. Critically analyse employee-employer issues using relevant ethical and legal processes and approaches to solve problems.</p>
9.	MEIE T07	ADVANCED OPERATION RESEARCH	2017	<p>Able to solve nonlinear problems using Kuhn Tucker conditions.</p> <p>2. Able to solve Un-constrained and constrained minimization problems using programming methods.</p> <p>3. Ability to solve multi objective problems using Goal programming.</p> <p>4. Able to develop meta heuristic algorithms to solve optimization problems.</p>
10.	MEIE P02	SIMULATION LABORATORY	2017	Able to understand the basic programming knowledge with respect to domain.

				<p>2. Able to develop a program to solve N job 2 machine problem using C, C++ software, and to develop a program in C, C++ to solve inventory price breaks problem</p> <p>3. Able to solve inventory control problem of ABC analysis in MS-EXCEL</p> <p>4. Able to solve queuing theory problems in TORA package.</p> <p>5. Able to solve linear programming and non-linear programming problems using TORA</p>
11.	MEIE E01	SYSTEM DYNAMICS	2017	<p>Ability to develop students' skills in analyzing, simulating, and identifying dynamic systems based upon their input-output responses.</p> <p>2. Develop and analyze a simulation model that provides a useful explanation of a given problematic behaviour in a narrowly-defined task</p> <p>3. Able to compare popular social science modeling paradigms such as research economics and cross impact theory</p>
12.	MEIE E02	LOGISTIC ENGINEERING AND MANAGEMENT	2017	<p>. An ability to apply the knowledge, techniques, skills, and modern tools of the discipline to Engineering Logistics technology;</p> <p>2. An ability to apply knowledge of engineering, management and technology to Engineering Logistics related issues;</p>

				<p>3. An ability to identify analyse and solve Engineering Logistics related issues;</p> <p>4. An ability to identify, analyse, and solve narrowly defined Engineering Logistics technology problems;</p>
13.	MEIE E03	QUANTITATIVE MODELS FOR SUPPLY CHAIN MANAGEMENT	2017	<p>Understand and Implement information system in supply chain.</p> <p>2. Analyze Mathematical modeling of Supply Chain</p> <p>3. Understand basics of</p> <p>4. Reverse & Agile supply chain.</p> <p>5. Analyze various case studies on supply chain</p>
14.	MEIE E04	FACILITIES PLANNING	2017	<p>. Able to know the concept of facilities planning that aid in design of Product, Process and schedule design.</p> <p>2. Able to design Material handling equipment for industrial and non industrial purpose.</p> <p>3. Able to design handling, receiving and shipping of goods using computer aided layout software.</p> <p>4. Able to solve Problems of ware house, conveyor and allocation models using quantitative approach.</p> <p>5. Able to simulate the waiting line models, storage models and conveyor models using simulation software.</p>
15.	MEIE E05	SERVICE ENGINEERING MANAGEMENT	2017	<p>Able to acquire knowledge on focusing on customer and service management</p> <p>2. Able to manage modern control system, BPO and Services</p>

				<p>marketing</p> <p>3. Able to maintain good customer relationship, data mining knowledge management</p> <p>4. Able to apply utility theory, simulation modeling in management science applications</p>
16.	MEIE E06	DISCRETE EVENT SYSTEM SIMULATION	2017	<p>Classify various simulation models and give practical examples for each category</p> <p>2. Construct a model for a given set of data and motivate its validity</p> <p>3. Generate and test random number variates and apply them to develop simulation models</p> <p>4. Analyze output data produced by a model and test validity of the model</p> <p>5. Explain parallel and distributed simulation methods</p>
17.	MEIE E07	FINANCIAL MANAGEMENT AND CONTROL	2017	<p>Clearly understand the cost management discipline and process</p> <p>2. Recognise potential pitfalls and understand avoidance strategies</p> <p>3. Use a cost management estimation and control plan</p> <p>4. Understand the process and importance of Cost Estimation, Cost Budgeting and Cost Control</p> <p>5. Understand the financial analysis and flow of funds</p>
18.	MEIE E08	MARKETING	2017	<p>. State the role and functions of marketing within a range of</p>

		MANAGEMENT		<p>organizations.</p> <p>2. Describe key marketing concepts, theories and techniques for analysing a variety of marketing situations.</p> <p>3. Use written formats to communicate marketing outcomes.</p> <p>4. Apply the introduced conceptual frameworks, theory and techniques to various marketing contexts.</p> <p>5. Synthesise ideas into a marketing plan.</p>
19.	MEPE E09	ENERGY MANAGEMENT	2017	<p>Understanding basics of demand side management and mechanisms (technical, legal or financial) that influence energy consumption.</p> <p>2. Recognizing opportunities for increasing rational use of alternative energies.</p> <p>3. Learning the basics of energy auditing with application on different sectors.</p> <p>4. Able to take the decisions in budget estimations and evaluate risk analysis</p>
20.	MEPE E10	DESIGN FOR MANUFACTURING	2017	<p>Design components for machining</p> <p>2. Simulate the casting design and choose the best casting process for a specific product.</p> <p>3. Evaluate the effect of thermal stresses in weld joints</p> <p>4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation</p>

				<p>mechanisms</p> <p>5. Design plastic components for machining and joining and selecting a proper processes for different joining case</p>
21.	MEIE E09	DESIGN AND ANALYSIS OF EXPERIMENTS	2017	<p>. Formulate objective(s) and identify key factors in designing experiments for a given problem.</p> <p>2. Develop appropriate experimental design to conduct experiments for a given problem.</p> <p>3. Analyze experimental data to derive valid conclusions.</p> <p>4. Optimize process conditions by developing empirical models using experimental data.</p> <p>5. Design robust products and processes using parameter design approach.</p>
22.	MEIE E10	PRODUCTIVITY ENGINEERING MANAGEMENT	2017	<p>Identification and formulation productivity measurement at national level with diversity concepts</p> <p>2. Development of suitable software for productive evaluation based on objective matrix and decision tree</p> <p>3. Identification of long term and short term productive models in industry for improvement of the productivity</p> <p>4. University-industry interaction for entrepreneurship development and technology transfer</p>
23.	MEOE T01	PROJECT MANAGEMENT	2017	<p>Better understanding of the project principles and project life cycle so as to avoid the project delays and the design stage itself to</p>

				<p>arrive at the Break-even point</p> <p>2. Better analysis of the project planning, the role and responsibility of the team work in the assignment of jobs</p> <p>3. Organization structure the responsibilities and role of leaders and team management</p> <p>4. Process of implementation of performance measurements for better productivity and project process control</p>
24.	MEOE T02	NON CONVENTIONAL ENERGY SOURCES	2017	<p>Need and analysis of non-conventional energy sources and the processes of energy conservation.</p> <p>2. Harnessing the solar energy, storage devices so as to produce electricity; ways for energy distribution.</p> <p>3. Understand the issue of fuel availability and analyse the supply and demand of fuel at the national level</p> <p>4. Comparison of the coal-fired power plant with the non-conventional energy utilization to reduce environmental pollution.</p> <p>5. Working principle of carnot cycle for maximum efficiency, need for power generation systems with thermodynamic concepts.</p>

M.Tech MECHANICAL ENGINEERING

(Production Engineering)

S.No	Course Code	Name of the Course	Year of Introduction	Course Outcomes
1.	MAME T01	APPLIED PROBABILITY AND STATISTICS	2017	Basic concepts of sampling applied in population enumeration. 2. Regression techniques for application and forecast the demand and related variables 3. Testing of hypothesis using statistical distributions. 4. Correlation between the observed values and experimental values for analysis of variance.
2.	MEPE T01	ADVANCED MATERIAL TECHNOLOGY	2017	Students are capable to define the concept of materials i.e., conventional materials with their structure, such as electronic configuration, structure of atom, etc. 2. Students become aware of different conventional materials such as metallic and nonmetallic materials, structures and their applications. 3. Students will be able to demonstrate the need for newer materials by comparing the limitations of conventional materials. 4. They will be able to compare the types of newer materials along with their properties and applications. 5. They will be able to compile about the properties, structure of ceramic materials and their need for newer applications and processing techniques
3.		ADVANCED MANUFACTURING	2017	Students can able to demonstrate different unconventional machining processes

		PROCESSES		<p>2. Able to test the influence of different process parameters on the performance and their applications</p> <p>3. Able to select the different types of composites for different applications.</p>
4.	MEIE T03	OPERATIONS PLANNING AND CONTROL	2017	<p>Forecasting principles and techniques for short range and long range planning</p> <p>2. Production requirements for each product and plan the shop floor activities</p> <p>3. Work station loading and scheduling of paths to avoid bottle necks for smooth production</p> <p>4. Solution for product mix decision using OR techniques.</p> <p>5. Optimal job sequences to achieve the minimum make span with maximum production output</p>
5.	MEPE T03	COMPUTER INTEGRATED MANUFACTURING	2017	<p>Understand the effect of manufacturing automation strategies and derive production metrics.</p> <p>2. Analyze automated flow lines and assembly systems, and balance the line.</p> <p>3. Design automated material handling and storage systems for a typical production system.</p> <p>4. Design a manufacturing cell and cellular manufacturing system.</p> <p>5. Develop CAPP systems for rotational and prismatic parts.</p>
6.	MEPE T04	AUTOMATION IN MANUFACTURING	2017	Solve the line balancing problems in the various flow line systems with and without use buffer storage

				<ol style="list-style-type: none"> 2. Understand the different automated material handling, storage and retrieval systems and automated inspection systems. 3. Use of Adaptive Control principles and implement the same online inspection and control
7.	MEPE T05	ADDITIVE MANUFACTURING	2017	<ol style="list-style-type: none"> 1. Identify the need for time compression in product development and manufacturing. 2. Model and fabricate any complex engineering product. 3. Select the rapid manufacturing technology for a given application. 4. Minimize various errors that are occurring during conversion of CAD models. 5. Illustrate the working principles of various rapid manufacturing technologies. Optimize the quality of parts produced by the various rapid manufacturing technologies
8.	MEPE T06	METAL CUTTING AND CUTTING TOOL DESIGN	2017	<p>Ability to extend, through modeling techniques, the single point, multiple point and abrasive machining processes</p> <ol style="list-style-type: none"> 2. Estimate the material removal rate and cutting force, in an industrially useful manner, for practical machining processes 3. Prediction of the surface finish in machining processes 4. Understand the practical aspects of tool wear and tool life, and their influence on economics 5. Understand the tool and work piece temperatures and their effect on quality

9.	MEPE P02	CAD / CAM LABORATORY	2017	<ol style="list-style-type: none"> 1. Practicing the concepts of computer programming for line, circle and other curve generation 2. Knowing the programme for transformation of mathematical matrices for translation, rotation, scaling and mirror reflection 3. Knowing and writing the programs to develop bezier and other curve fitting. 4. Knowing the utilization and application of Auto CAD software in 2D and 3D models 5. Training and usage of Edge CAM Iron CAD, Robo cells, CATIA and CAD / CAM softwares
10.	MEPE E01	ROBOTICS	2017	<ol style="list-style-type: none"> 1. Importance of robotics in today and future goods production 2. Robot configuration and subsystems 3. Principles of robot programming and handle with typical robot 4. Working of mobile robots 5. The Student must be able to design automatic manufacturing cells with robotic control using the principle behind robotic drive system, end effect ors, sensor, machine vision robot kinematics and programming
11.	MEPE E02	ADVANCED CASTING TECHNOLOGY	2017	<ol style="list-style-type: none"> 1. Knowing and identification of materials for moulding the additives, coating and the methods of sand controls 2. Identification of different furnaces for metal melting and design the suitable furnace depending materials 3. Understanding of the concepts related to the casting processes and the factor those influence the design process for metals and alloys 4. Knowing the various properties of liquid metals and their compositions and attain the various alloys depending upon the temperature, Iron-carbon diagram 5. Understanding the principles of mechanization of foundries with their layouts and purchase of suitable layout
12.	MEPE E03	OIL HYDRAULICS AND PNEUMATICS	2017	<ol style="list-style-type: none"> 1. Identify and analyze the functional requirements of a power transmission system for a given application. (Application involving fluid power transmission) 2. Design an appropriate hydraulic or pneumatic circuit or combination circuit like electro- hydraulics, electro-pneumatics for a given application.

				<p>Develop a circuit diagram.</p> <p>3. Visualize how the hydraulic/pneumatic circuit will work to accomplish the function.</p> <p>4. Selection and sizing of components of the circuit</p>
13.	MEPE E04	METROLOGY AND COMPUTER AIDED INSPECTION	2017	<p>Metrology, quality control and Inspection so that they can meet the challenges in the industries.</p> <p>2. Various instruments and measuring systems with the help of laser and other advanced computer integrated systems.</p> <p>3. Students will be able to measure any type of features, forms with the help of CMM.</p>
14.	MEPE E05	EXPERT SYSTEMS IN MANUFACTURING	2017	<p>Fundamental theories, concepts, and applications of computer science in solving real-time problems.</p> <p>2. Able to Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information.</p> <p>3. Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems.</p> <p>4. Able to solve the problems in the field of machining, inventory control, process planning with the help of expert systems.</p>
15.	MEPE E06	ADVANCED WELDING PROCESSES	2017	<p>Weldability and perform different weldability testing for different metals.</p> <p>2. Different dissimilar metal and its cladding.</p> <p>3. Application of preheat and PWHT of weld joints as per codes and standards used in fabrication industry.</p> <p>4. Knowledge about different methods for increasing service life of equipment</p>
16.	MEPE E07	METAL FORMING TECHNOLOGY	2017	<p>Metal forming fundamentals and applications.</p> <p>2. Metal forming mechanics.</p> <p>3. Workability of testing techniques.</p> <p>4. Tribology in metal forming and other phenomena</p>
17.	MEPE E08	FINITE ELEMENT METHOD	2017	<p>Able to design, set up, and conduct engineering experiments and analyze the results.</p> <p>2. An ability to carry out projects and research in interdisciplinary areas.</p>

				<p>3. Graduates will possess managerial and leadership skills with professional ethical practices and will understand the proper use of technical papers, copyrights and patents, recent advances in Finite Element Method field.</p> <p>4. Able to understand the impact of Finite Element Method solutions in a global, economic, environmental, and societal context by participating at national level competitions like technical paper presentation, quiz programs, essay writing competitions, Industrial tours, Alumni association.</p> <p>5. Recognition of the need for, and an ability to engage in lifelong learning and comprehend the current professional issues.</p>
18.	MEPE E09	ENERGY MANAGEMENT	2017	<p>Understanding basics of demand side management and mechanisms (technical, legal or financial) that influence energy consumption.</p> <p>2. Recognizing opportunities for increasing rational use of alternative energies.</p> <p>3. Learning the basics of energy auditing with application on different sectors.</p> <p>4. Able to take the decisions in budget estimations and evaluate risk analysis</p>
19.	MEPE E10	DESIGN FOR MANUFACTURING	2017	<p>Design components for machining</p> <p>2. Simulate the casting design and choose the best casting process for a specific product.</p> <p>3. Evaluate the effect of thermal stresses in weld joints</p> <p>4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation mechanisms</p> <p>5. Design plastic components for machining and joining and selecting a proper processes for different joining cases</p>
20.	MEIE E09	DESIGN AND ANALYSIS OF EXPERIMENTS	2017	<p>1. Formulate objective(s) and identify key factors in designing experiments for a given problem.</p> <p>2. Develop appropriate experimental design to conduct experiments for a given problem.</p> <p>3. Analyze experimental data to derive valid conclusions.</p> <p>4. Optimize process conditions by developing empirical models using experimental data.</p>

				5. Design robust products and processes using parameter design approach
21.	MEIE E10	PRODUCTIVITY ENGINEERING MANAGEMENT	2017	<p>1. Identification and formulation productivity measurement at national level with diversity concepts</p> <p>2. Development of suitable software for productive evaluation based on objective matrix and decision tree</p> <p>3. Identification of long term and short term productive models in industry for improvement of the productivity</p> <p>4. University-industry interaction for entrepreneurship development and technology transfer</p>
22.	MEOE T01	PROJECT MANAGEMENT	2017	<p>1. Better understanding of the project principles and project life cycle so as to avoid the project delays and the design stage itself to arrive at the Break-even point</p> <p>2. Better analysis of the project planning, the role and responsibility of the team work in the assignment of jobs</p> <p>3. Organization structure the responsibilities and role of leaders and team management</p> <p>4. Process of implementation of performance measurements for better productivity and project process control</p>
23.	MEOE T02	NON CONVENTIONAL ENERGY SOURCES		<p>1. Need and analysis of non-conventional energy sources and the processes of energy conservation.</p> <p>2. Harnessing the solar energy, storage devices so as to produce electricity; ways for energy distribution.</p> <p>3. Understand the issue of fuel availability and analyse the supply and demand of fuel at the national level</p> <p>4. Comparison of the coal-fired power plant with the non-conventional energy utilization to reduce environmental pollution.</p> <p>5. Working principle of carnot cycle for maximum efficiency, need for power generation systems with thermodynamic concepts</p>