SRI VENKATESWARA UNIVERSITY::TIRUPATI

DEPARTMENT OF GEOGRAPHY

As per NEP-2020 &NHEQP guidelines of APSCHE

M.Sc. GEOGRAPHY (WEF 2024-2025)

scheme of Examinations

SEMESTER – I

S.No	Course	Code	Title of the Course	H/W	C	SEE	IA	Total Marks
1	CC	GEG-101	1-Geomorpology	4	4	70	30	100
2		GEG-102	2(A)-Cartography	4	3	50	25	75
3			2(B)- Regional Geography of Andhra Pradesh					
		GEG-103	3(A)- Economic Geography	4	3	50	25	75
			3(B)-Environmental Studies					
4	P	GEG-104	Practical-I-Map Projections	6	2	35	15	50
5	SOC	GEG-105	1(A)-Quantitative Techniques	4	3	50	25	75
			1(B)-computer Basics					
6		GEG-106	2(A)-Map Analysis	4	3	50	25	75
			2(B)-Excel for beginners					
7	P	GEG-107	Practical -II -Terrain Mapping Techniques & Map Analysis	6	2	35	15	50
8	Audit-Course	GEG-108	Indian Knowledge Systems-1	4	0	0	0	0
			Total	36	20	340	160	500

SEMESTER - II

S.No	Course	Code	Title of the Course	H/W	C	SEE	IA	Total Marks
1	CC	GEG-201	4-Climatology	4	4	70	30	100
2		GEG-202	5(A)-Geographical Thought	4	3	50	25	75
3			5(B)-Physical Geography of India					
		GEG-203	6(A)-Regional Planning	4	3	50	25	75
			6(B)-Regional Geography of India					
4	P	GEG-204	Practical-III-Interpretation of Topographical maps and weather Maps	6	2	35	15	50
5	SOC	GEG-205	3(A)- Geographical Information System(GIS)	4	3	50	25	75
			3(B)- Basic Research for Geographers					
6		GEG-206	4(A)- Global positioning System(GPS)and Global navigation satellite system(GNSS)	4	3	50	25	75
			4((B)-Advance Survey Techniques					
7	P	GEG-207	Practical-IV- Geographical Information System(GIS)	6	2	35	15	50
8	OOTC	GEG-208	Open online Transdisplinary Course-1	-	2	-	-	-
9	Audit-Course	GEG-209	Indian Knowledge Systems-2	4	0	0	0	0

	Total	36	22	340	160	500

SEMESTER - III

S.No	Course	Code	Title of the Course	H/W	C	SEE	IA	Total Marks
1	CC	GEG-301	7-Urban Geography	4	4	70	30	100
2		GEG-302	8(A)-Principles of Remote Sensing	4	3	50	25	75
3			8(B)- Water and Soil Resources Management					
		GEG-303	9(A)- Disaster Management Studies	4	3	50	25	75
			9(B)-Agriculture Geography					
4	P	GEG-304	Practical-V- Techniques of Mapping	6	2	35	15	50
5	SOC	GEG-305	5(A)-Research techniques for Geographical Studies	4	3	50	25	75
			5(B)-3DGIS(Geographical Information System)					
6		GEG-306	6(A)- Advanced Remote Sensing	4	3	50	25	75
			6(B)-Land use and Land cover analysis					
7	P	GEG-307	Practical-VI-Remote sensing applications	6	2	35	15	50
8	OOTC	GEG-308	Open online Trans displinary Course-2	-	2	-	-	-
*	Seminar / Tutorials / Remedial Classes and quiz as part of internal Assessment			4	0	0	0	0
			Total	36	22	340	160	500

SEMESTER -IV

S.No	Course	Code	Title of the Course	H/W	C	SEE	IA	Total Marks
1	OOSDC	GEG-401	Open online skill Development Courses	-	8	-	.-0	0
2	PW	GEG-402	Project Work-Orientation Classes	24	12	300	0	300
*	Conducting classes for competitive exams, communication skills, UGC / CSIRNET / APSET examinations			12	-	-	--	
			Total	36	20	300	0	300
Grand Total ALL Semesters				144	84	1320	480	1800

M.SC-Geography-Semester-I
GEG-CC- 101-1-GEOMORPHOLOGY

Learning Objectives

- To show the landforms, landscape evolution, various land forming processes with respect to time, climate and tectonic regimes, the course shall further convey an understanding on land forming processes with different Geomorphic agents and processes on different temporal and spatial magnitude.
- 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.
- To Examine Earth's plate tectonic framework. Explain the relationship between earthquakes and volcanoes

Learning Outcomes

- After the completion of the course, Students will be able to
- 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.
- Describes the landform and landform processes in different climatic zones and tectonic regimes.
- Compare and discusses the formation of large scale landforms involving both exogenous and endogenous processes.
- Know how human, physical and environmental components of the world interact.

SYLLABUS

Unit I : Nature, Definition, Scope and recent trends in Geomorphology: Rocks– Origin, Classification and distribution, Interior of the Earth. Geological time -scale.

Unit II : Earth movements: Epierogenic and Orogenic earth movements. Theories of continental drift, Isostasy and plate tectonics. Earthquakes, volcanoes and their distribution.

Unit III : Geomorphic agents and Processes: Weathering, Erosion, Mass wasting. Concept of cycle of erosion, Davi s and Penck concepts in the evolution of Landforms.

Unit IV : Geomorphic Processes: Erosional and depositional landforms made by a) rivers, b) Glaciers, c) wind, d) underground water, e) waves & currents.

Suggested Readings.

- Monkhouse, F.J. : Principles of Physical Geography, Hodder and Stoughton, London, 1960.
- Sparks, B.W. : Geomorphology, Longmans, London, 1960.
- Strahler, A.N. and Strahler, A.H. : Modern Physical Geography : John Wiley & Sons, Revised edition 1992.
- Thornbury, W.D. : Principle s of Geomorphology, Wiley Eastern, 1969.
- Wooldridge, S.W. and Morgan, R.S. : The Physical Basis Geography – An outline of Geomorphology, Longman Green & Co, London, 1959.

GEG-CC-102-2A-CARTOGRAPHY

Learning Objective

- To apprise the students 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.
- To teach the representation and conversions of scales.
- To provide the knowledge on map design, layout, lettering, toponomy, drawing surface and equipment.
- To give the clear picture on the changing process of map making from analogue to digital.
- Learning Outcomes

After the completion of the course, Students will be able to

1. Explain the importance of advanced cartography in map making and presenting.
2. Acquire good knowledge about different procedure of map making and various projection system of map making by developing broad knowledge about latitude, longitude, meridians, parallels etc.
3. Developing their quantitative application in geographical study which gives more accuracy in any geographical enquiry which can further helps students in conducting research activities.
4. Perform map layout and map interpretation for any geographical area.
5. Acquire knowledge of different method of surveying and map making by using proper tools and technique and can apply this knowledge in future research works.

SYLLABUS

Unit I : Cartography – definition. Cartography is a science of human communication; Scales – Methods of representation & conversions; Map projections – classification and choice of projections. Merits and demerits of cylindrical, conical, zenithal and conventional projections.

Unit II : Semiology – Kinds of symbols – Mapping qualitative and quantitative point, Line and Area symbols. Types of maps and their uses. Topographical maps: Elements of topographical maps, scales and numbering of Toposheets.

Unit III : Map design and layout – Theory of visual perception – constraints and Restrictions in map design. Lettering and Toponomy. Mechanics of map construction: Drawing surfaces – Drawing Equipment.

Unit IV : Mapping the qualitative and quantitative data. Thematic mapping; concept of map base, map compilations & generalizations. Concepts of Geographical Information System (GIS).

Suggested Readings

1. Khan, Z.A. : Text book of practical geography, concept, New Delhi, 1998.
2. Monkhouse, F.J. & Wilkinson, H.R. : Maps and Diagrams, Methuen, London, 1994 .
3. Steers, J.A. : Map Projections, University of London Press, London.
4. Burrough, P.A. : Principles of geographic information systems for land resource assessment, Oxford University Press, New York, 1986.
5. Fraser Taylor D.R. : Geographic Information Systems, Pergaman Press, Oxford, 1991.
6. Star J and J. Estes : Geographic information systems. An introduction, Prentice Hall, Englewood Cliff, New Jersy, 1994.
7. Misra, R.P. and Rames, A.: Fundamentals of Cartography, Mcmillan Co., New Delhi, 1986.
8. Robinson, A.H. et al.: Elements of Cartography, John Wiley & Sons, U.S.A., 1995.

9. Sarkar, A.K., Practical Geography : A systematic approach; Oriental Longman, Calcutta, 1997.
10. Singh, R.L. and Dutt, P.K. Elements of Practical Geography, Kalyani publishers, New Delhi, 1979.

GEG-CC-102-2B- REGIONAL GEOGRAPHY OF INDIA WITH SPECIAL REFERENCE ANDHRA PRADESH

Learning objectives:

- To develop the understanding about physical features of Andhra Pradesh..
- To familiarize the students with physiography, Drainage, Climate, soil and natural vegetation of India and Andhra Pradesh.
- To visualise the population, mineral and transportation structures in Andhra Pradesh

Learning Outcomes:

- After the completion of the course, Students will be able to
- Develop the understanding about physical features of Andhra Pradesh..
- Familiarize the students with physiography, Drainage, Climate, soil and natural vegetation of India and Andhra Pradesh.
- Visualise the population, mineral and transportation structures in Andhra Pradesh

Unit I : India: Location and Geographical Setting of India – Major Physiographic Divisions, Soils, Vegetation, drainage. Climatic Regions and their Characteristics in India.

Unit II : India: Mineral Resources – Coal, Iron Ore and petroleum, Industries Iron and Steel, Oil Refinery and Paper industries; Industrial Regions of India; Transport; Land, Water and Air, Imports and Exports.

Unit III : India: Population Distribution; Density growth problems, over population and population policies in India; Agriculture Types; Irrigation and Power; Multipurpose projects. Major food grain crops; Rice and Wheat; Major commercial crops – Coffee and Tea.

Unit IV : Andhra Pradesh: Relief, climate, soils and vegetation. Major Regions; Major Crops; Mineral wealth and industrial development; population.

Suggested Readings

- Spate, O.H.K. and Learmonth, A.T.A. India and Pakistan, Third Edition, Methuen, London, 1967.
- Memoria, C.B. : Economic and Commercial Geography of India, Shirlal Agarwal and Co., Agra, 1991.
- Krishnan, M.B. : Geology of India, Higginbothams, Madras.
- Alam, S.M. : Planning atlas of Andhra Pradesh.
- Khullar: India, A comprehensive Geography. Kalyani Publishers, New Delhi.198

GEG-CC-103-3A-ECONOMIC GEOGRAPHY

Learning Objectives

- Analyze the evolution and scope of economic geography, its relationship with social sciences, and the classification of economies and economic sectors.
- Classify natural resources (renewable, non-renewable, biotic, and abiotic) and describe their role in economic activities like mining, forestry, and agriculture.
- Understand the spatial distribution of agricultural resources and the classification of minerals, focusing on their significance in major industries.

- Explain Alfred Weber's industrial location theory and analyze the geographical factors influencing the distribution of major global industries such as iron, steel, and textiles.
- Learning outcomes

After the completion of the course, Students will be able to

1. Students will understand the scope of economic geography, its relationship with social sciences, and classify economies and sectors while exploring trends like globalization and technological impacts.
2. Students will classify natural resources as renewable or non-renewable, while exploring their role in economic activities and gaining insights into resource conservation and global economic trends.
3. Students will comprehend the global distribution of major food crops, minerals, and industries, while understanding the classification of minerals into ferrous and non-ferrous types.
4. Students will understand and apply Alfred Weber's industrial location theory to analyze how geographical factors influence the development and location of industries like iron, steel, textiles, and shipbuilding.

SYLLABUS:

Unit I : Nature and Scope of economic geography and recent trends in economic geography, relation of economic geography with economics and other branches of social sciences, classification of economies; sectors of economy (Primary, secondary and tertiary).

Unit II : Natural resources: Nature and classification– renewable and non - renewable, biotic and abiotic, conservation of resources, changing nature of economic activities; mining, forestry, agriculture, industry, trade and transport.

Unit III : Agricultural Resources: Spatial distribution of major food crops and Cash crops of the world (rice, wheat, millets, pulses, coffee and tea).Minerals resources: Classification of minerals (ferrous and non-ferrous).Major industries: Iron and Steel, Textiles, ship -building and their distribution.

Unit IV : Industrial location theory – Alfred Weber: Geographical factors in the development of major industries.

References

1. Boesch, H. : A Geography of World Economy, D. Van Nostrand Co., New York, 1964.
2. Chapman, J.D. : Geography and Energy, Longman, London, 1989.
3. Gregor, H.F. : Geography of Agri culture, Prentice Hall, New Jersey, USA, 1970.
4. Griggs, D.B. : The Agricultural Systems of the World, Cambridge University Press, New York, 1974.
5. Hartshome, T.N. and Alexander, J.W. : Economic Geography, Prentice Hall, New Delhi, 1988.
6. Jones, C.F. and Darke nwald, G.G. : Economic Geography, McMilan Co., New York, 1975.
7. Millar E.: Geography of Manufacturing, Prentice Hall, New York, 1962.
8. Raza, M. and Agrawal, Y. : Transport Geography of India, Concept, New Delhi, 1986.
9. Smith, D.M. : Industrial Location – An Economic Geographical Analysis, John Willey, New York, 1971.
10. Thomas, R.S. : The Geography of Economic Activities, McGraw Hill, New York, 1962.

GEG-CC-103-3B- ENVIRONMENTAL STUDIES

Learning objectives:

- To create the environmental aptitude among students.
- To familiarize the students with concepts, issues, approaches about physical andsocial environment.
- To acquainted with contemporary environmental problems and challenges.
- To provide knowledge on Ecosystem, Biomes, food chain and hydrological cycle.

Learning Outcomes

- After the completion of the course, Students will be able to
- 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.

SYLLABUS

Unit I : Nature, Scope and Significance of Environmental Studies; Concepts of Ecology, Ecological balance and the need for Ecological Approach.

Unit II : Concepts of Ecosystem : Structure, Classification and functioning of the ecosystem, Biomes, food web, food pyramid, Nutrient cycle, hydrological cycle.

Unit III : Impact of population growth on ecosystem. Agriculture, green revolution, HYV and pesticides. Man's impact on land, mining, coastal areas and transport

Unit IV : Environmental impact assessment, Environmental reconstruction, management and planning, the need for interdisciplinary approach. The Role of GIS and Remote Sensing in Environmental Management.

Suggested Readings

1. Turk. : Introduction to Environment Studies, Sanndora, 1980.
2. Detwyler : Man's Impact on Environment, 1971.
3. Strahler & Strahler, Geography of Man's Environment Wiley, 1977.
4. Bennet : Man and Earth's Ecosystem, Wiley, 1975.
5. Leopoid and Lune (Ed): A procedure for evaluating environmental impact.
6. Savindra Singh: Environmental geography– Prayagpustak Bhavan, Allahabad, 2000.
7. Dikshit, R.D.:Geography and Teaching of the environment, geography department, Poona University, 1984.
8. Agarwal, D.P. Man and Environment in India through ages, Book & Books, 1992

GEG-P-104-PRACTICAL-I- MAP PROJECTIONS

Learning Objectives

- To apprise the students about the art and science of map making and representation.
- To explains the usage of different types of projections
- To focus on the importance of scale and projection in the process of representing the earth surface

Learning Outcomes:

- After the completion of the course, Students will be able to
- Explain the concept of map, scale and projections
- Student can explain the purpose of projections
- The main outcome of this course is students can able to select different projections for different geographical areas.

SYLLABUS

Unit I : Introduction of Projections, Zenithal Projections: Equi-distant; Equal area, Stereographics, Gnomonic.

Unit II : Cylindrical Projections: Equi -distant, Equal area, Mercator.

Unit III : Conical Project ions: One standard parallel, two standard parallel; Bonne's, polyconic.

Unit IV : International map projection: Sinusodial - Molweides projections.

Suggested Readings

1. Khan, Z.A. : Text book of practical geography : concept; New Delhi, 1998.
2. Misra, R.P. and Ramesh, A.: Fundamentals of Cartography, Concept, New Delhi, 1989.
3. Singh, R.L.: Map work and practical geography; central book depot; Allahabad, 1972.
4. Steers, J.A. : Map projections, University of London Press, Lon SOC-105-1A- Quantitative Techniques

GEG-SOC-105-1A- Quantitative Techniques

Learning objectives

1. To understand the relation between Quantitative techniques and Geography
2. To analyzed and representing the geographical data
3. To Explore the use of Quantitative techniques in Geographical Techniques.
4. To Improve the knowledge on suitability of statistical methods to different data analysis

Learning outcomes

1. After the completion of the course, students will able to
2. Understand the relation between Quantitative techniques and Geographical studies
3. Analyse and represent the Geographical data
4. Explore use of Quantitative techniques in Geographical studies
5. Enhance the knowledge an suitability of statistical methods to different Geographical purpose.

Unit I : Define quantitative techniques, history, use and importance in Geographical Studies. Frequency Distribution.

Unit II : Measures of Central Tendency
1. Arithmetic Mean 2. Median3. Mode
4. Geometric Mean 5. Harmonic Mean

Unit III : Graphical Representation
1. Histogram 2. Frequency polygon
3. Frequency curve 4. Ogive curve
5. Less than and more than Ogive curve

Unit IV : Measures of dispersion
1. Mean deviation 2. Quartile deviation 3. Standard deviation

Unit V : Correlation - Rank Correlation

Unit VI Sampling methods: Meaning, need for sampling, types of sampling.

Suggested Readings

1. Aslam Mahmood – Statistical Methods in Geographical Studies, Rajesh Publication, New Delhi, 1977.
2. Cole, J.P. & King, DAM – Quantitative Methods in Geography, John Wiley and Sons, New York, 1968.
3. Singh, R.L. Elements of Practical Geography, Kalyani Publishers, 1992.
4. Toyni, P. and Newby, Techniques of Map, Longman, London, 1965.

GEG-SOC-105-1B-Computer Basics

Learning Objectives

1. To understand the basic components of a computer, including hardware, software, CPU, Memory, and file management techniques.
2. To gain proficiency in using MS Word for creating, formatting, editing, and saving documents, as well as applying features like bullets, tables, and page layouts.
3. To develop basic skills in MS Excel and PowerPoint, including creating spreadsheets, designing presentations, and adding animations.
4. To learn the fundamentals of internet browsing, email communication, and using online collaboration tools such as Zoom, Google Meet, and Microsoft Teams.

Learning Outcomes

1. Students will be able to operate a computer efficiently, manage files, and perform basic keyboard and mouse operations.
2. Students will create, edit, and format professional documents in MS Word, with an understanding of advanced features like tables, pictures, and page layouts.
3. Students will design and deliver presentations in PowerPoint and utilize Excel for data entry and basic spreadsheet management.
4. Students will confidently browse the internet, send emails, and use online tools for communication and collaboration in an academic or professional setting.

SYLLABUS

Unit I : Introduction to computers- Hardware, software, CPU, memory, storage; File Management- file types, file systems, folder structures, and basic file operations (create, copy, move, delete); Basic Key board and Mouse Operations.

Unit II : M.S word and Word processing – creating, formatting, editing, and saving documents; Applying bullets and numbering; Creation of Table, Insert Pictures, Add shapes, Header and Footer and Page layout.

Unit III : M.S. Excel and power point presentation- Introduction of M.S. Excel and creating, Designing, Animation of slides.

Unit IV : Introduction to the Internet and Online Tools-Basics of Internet Browsing (web browsers, search engines, and safe online navigation); Email and Online Communication; Digital Collaboration Tools- Zoom, Google Meet, and Microsoft Teams for online meetings and collaboration.

Suggested Readings:

1. Fundamentals of Computer (First Edition-2009) Publisher: McGraw- Hillby Balaguruswamy.
2. Computer Fundamentals (FourthEdition-2007) Publisher: BPB Publications by Pradeep Sinha and PritiSinha.
3. Computer Fundamentals (First Edition-2010) Publisher: Pearson by Anita Goel
4. Introduction to Computers (First Edition 2008) Publisher: Cengage Learning By Gary B.Shelly, Thomas J. Cashman and Misty E. Vermaat
5. Fundamentals of Computers and Programming with C by A.K.Sharma Dhanpat Rai publications

6. Computer Networks (4th Edition) by Andrew S.Tanenbaum
7. Fundamental of Information Technology- Including Lab work; ITL-Education solution Limited- Vinod Babu Bandari, Published by Dorling Kindersley (India) pvt ,ltd,2012

GEG-SOC-106-2A-Map Analysis

Learning Objective:

1. To understand the fundamental principles of cartography and the basic skills required for map reading and interpretation
2. To develop skills in analyzing and interpreting topographic maps.
3. To explore the use and interpretation of thematic maps in geographic studies.
4. To introduce the concepts of GIS and remote sensing and their applications in map analysis.

Learning Out comes:

1. Students gain a solid understanding of map scales, projections, symbols, and coordinate systems.
2. Develop skills to identify and analyze landforms, slopes, and drainage patterns on topographic maps.
3. Students enhance ability to analyze thematic maps and assess spatial distributions and geographic trends.
4. Students to acquire foundational knowledge and skills in using GIS and Remote Sensing for urban planning, environmental monitoring, and disaster management.

SYLLABUS

Unit I : Map Analysis- Introduction, Definition, the purpose of map analysis, Importance and Advantages of Map Analysis, the concept of accurate map.

Unit II : Topographic Map Analysis- Representation of relief – Spot heights, Hachures, Hill shading, Layer tints & colours – Representation of important landform features by contours –Concave slope, convex slope, Undulating slope, Uniform slope, Terraced slope, Conical hill, Plateau, Plain with knoll, Spur, cliff, Waterfall, Delta, Estuary, V-shaped valley, U-shaped valley& Gorges. Contour Slope Analysis- Smith and Wentworth methods.

Unit III : Thematic Map Analysis- Mapping of agricultural and Land use data Analysis- Dot method, Choro-chromatic Map, Choropleth Map, Isopleths, Iso-chromatic.– Crop concentration and Diversification – Ranking of Crops by Quantitative and Qualitative symbols – Crop combination.

Unit IV : Measurement Tools for Map analysis- Traditional Tools (Rulers, Protractors, Planimeters) Digital Tools (GIS Software, Online Mapping Tools), Impact of Digital vs Traditional Map Measurements. Use of Satellite and Aerial Imagery for Map Measurements, Area Measurement between – Points and area in maps, Area measurement methods in Maps: Source, Triangle, Rectangle and Circular methods.

Suggested Readings

1.John Bygott: An introduction to map work and Practical Geography; university Tutorial Press Ltd. London1974.
Monkhouse, F.J.H.R and Wilkinson: Maps and Diagrams; Methuen and co., London,1984.
R.L. Singh. Elements of Practical Geography, Kalyani Publishers, New Delhi
R.Singh & Kanujia. Map work and practical geography, Central Book Depot, Allahabad.

GEG-SOC-106-2B-Excel for Beginners

Learning Objectives:

1. To familiarize students with the Excel interface and basic functions relevant to geographical data management.
2. To develop skills in handling and analyzing geographical data sets using Excel.
3. To learn how to create and interpret visual representations of geographical data in Excel.
4. To explore advanced Excel techniques for more complex geographical data analysis and presentation.

Learning Out comes:

1. Student to Develop foundational skills in Excel, including data entry, formatting, and basic functions relevant to geography.
2. Student Gain the ability to import, validate, and analyze geographical data using Excel tools and formulas.
3. Student learns to create and interpret charts, graphs, and maps to visually represent geographical information.
4. Student Master advanced Excel techniques such as pivot tables for geographic data analysis.

SYLLABUS

Unit I : Introduction to Excel and Basic Functions: Excel Interface Overview- Introduction to the Excel workspace, including ribbons, toolbars, worksheets, and workbooks; Basic Excel Functions- SUM, AVERAGE, MIN, MAX, and COUNT for analyzing geographical data; Sorting and Filtering Data.

Unit II : Working with Geographical Data in Excel: Importing and Exporting Data- Techniques for importing geographical data from various sources (e.g., CSV, text files) and exporting data for use in other applications; Using Formulas- Applying formulas to calculate distances, areas, Diameter, Radius and other geographic metrics.

Unit III : Visualization of Geographic Data: Creating Charts and Graphs- Bar and Line graph, pie chart for representing geographical data; Geographical Heat Maps- Creation of population density, rainfall and Temperature distribution; Data Series and Trend lines- Rainfall, Temperature, Population and Urbanization.

Unit IV : Advanced Excel Techniques for Geographic Analysis: Pivot Tables- Creating and using pivot tables to summarize and analyze large geographical datasets; Advanced Formulas- Using functions like VLOOKUP, HLOOKUP, Data Consolidation and Analysis -Combining multiple datasets for comprehensive geographical analysis;

Suggested Readings

- Microsoft Excel 2019 Bible" by Michael Alexander, Richard Kusleika, John Walkenbach.
- "Excel for Dummies" by Greg Harvey.
- "Excel Data Analysis for Dummies" by Paul McFedries
- "Excel 2019 Power Programming with VBA" by Michael Alexander, Dick Kusleika (For more advanced learning)
- "Geospatial Analysis: A Comprehensive Guide" by Michael de Smith, Michael F. Good child, Paul Longley (For advanced learners)
- GEG-107-PRACTICAL -II -TERRAIN MAPPING TECHNIQUES & MAP ANALYSIS

Learning Objective

1. To apprise the students about the Terrain mapping techniques
2. To project the representation of the landforms by using contour lines
3. To explains the methods of slope analysis
4. To develop the knowledge on the thematic maps
5. To Understand the data representation through the diagrammatic form and log graphs
6. To apprise the students to various aspects of cartography.
7. To introduce the basic concepts and key theoretical approaches in Advanced Cartography.
8. Learning Out come
9. To describes the art and science of map making and map analysis

SYLLABUS

Unit I : Interpolation of contours.
Unit II : Landforms represented by contours.
Unit III : Profiles: Serial, Superimposed, Projected, Composite.
Unit IV : Slope Analysis : Smith's and Wentworth's Methods.

Suggested Readings

1. Misra, R.P. and Ramesh, A. : Fundamentals of Cartography, concept, New Delhi, 1989.
2. Monkhouse, F.J.H.R. and Wilkinson : Maps and diagrams; Methuen and Co., London, 1984.
3. Peter Toyne & Peter Newby, T. : Techniques in human geography; MacMillan, London, 1972.

Audit Course
GEG-108 - Indian Knowledge Systems-1

Learning Objectives:

- To study the enriched scientific Indian heritage.
- To understanding of Indian Knowledge System.
- Develop an ability to apply the Indian Knowledge System to societal challenges faced today in areas such as holistic health, governance, public administration and sustainable living.

Learning Out comes:

- After completion of study, students able to
- Classify the key concepts of Indian Knowledge System and discuss the multi-faceted nature of knowledge contained in the Traditional Systems of India.
- Identify the importance of Yoga way of living in maintaining a sound physical, emotional and mental health.
- Recognize the relevance of Arthashastra in public administration and effective governance.

SYLLABUS

Unit I : Introduction to Indian Knowledge Systems (IKS): About Indian Knowledge System; Definition of Indigenous/ Traditional Knowledge; Scope, and Importance of Traditional Knowledge.

Unit II : Indian Heritage of Knowledge: Ancient Indian Knowledge: The Vedas and its components-the Vedangas Ancient Indian books and treaties: The Sastras.; The Great Indian Epics: The Ramayana and The Mahabharata Epics and religious treaties.

Unit III : Ancient India- Bharat Varsha: People of Ancient Bharat Varsha; Our great natural heritage: The great Himalayas and the rivers; The civilizations of the Sindhu-Ganga valley, and the Brahmaputra valley; Our coastal plains; Our Nature: Forests and Minerals; Ancient Indian Traditional Knowledge and Wisdom about nature and climate.

Unit IV : Contribution of Ancient India to Health Sciences: Traditional Indigenous systems of medicines in India: - Ayurveda and Yoga; Elements of Ayurveda: Gunas and Doshas, Pancha Mahabhuta and Sapta-dhatu; Concept of disease in Ayurveda; Ayurvedic lifestyle practices: Dinacharya and Ritucharya; Important Ayurvedic Texts; Hospitals in Ancient India; Ayurveda: Gift of India to the modern world.

Reference Books:

1. Baladev Upadhyaya, Samskrta Śāstrom ka Itihās, Chowkhambha, Varanasi, 2010.
2. D. M. Bose, S. N. Sen and B. V. Subbarayappa, Eds., A Concise History of Science in India, 2nd Ed., Universities Press, Hyderabad, 2010.
3. Astāngahrdaya, Vol. I, Sūtrasthāna and Śarīrasthāna, Translated by K. R. Srikantha Murthy, Vol. I, Krishnadas Academy, Varanasi, 1991.
4. Dharampal, The Beautiful Tree: Indian Indigenous Education in the Eighteenth Century, Dharampal Classics Series, Rashtrotthana Sahitya, Bengaluru, 2021.
5. Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavan RN. (2022), Introduction to Indian Knowledge System: Concepts and Applications. PHI Learning Private Ltd.
6. Mukul Chandra Bora, Foundations of Bharatiya Knowledge System. Khanna Book Publishing
7. D. M. Bose, S. N. Sen and B. V. Subbarayappa, Eds., A Concise History of Science in India, 2nd Ed., Universities Press, Hyderabad, 2010.

Semester-II

GEG-CC-201-4-CLIMATOLOGY

Learning Objective

- 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 climatologically system.
- To be able to analyse and interpret climatic data and classification of climate

Learning Outcomes

After the completion of the course, Students will be able to

- Obtain the knowledge on 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 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

SYLLABUS

Unit I : Nature and scope of climatology. Composition and structure of the Atmosphere–Insulation–heat balance, green house effect–vertical and Horizontal, distribution of Temperature.

Unit II : Atmospheric Pressure–Pressure gradient –Pressure belts–vertical and Horizontal distribution of pressure – winds – monsoons and cyclones.

Unit III : Water vapor-Humidity –Relative, absolute and specific humidity – condensation and types, cloud types, types of Rainfall–Koppen's and Thornth waite's scheme of climatic classification.

Unit IV : Theories of Climatic changes – Astronomical or Orbital Theory, Continent Displacement Theory. Micro Climates –agro climate, urban climate, global warming, heat Island, health hazards. Weather Forecasting-Problems and Prospects of weather Forecasting in India.

Suggested Readings

1. Crittch Field, J.H.:General Climatology, Prentice Hall, India, New Delhi,1993.
2. Lal, D.S.: Climatology, Chaitanya Publishing House, Allahabad, 1986.
3. Garrison, T.:Oceanography – An introduction to Marine Science. Books / Cole, Pacific Groue, USA, 2001.

GEG-CC-202-5A- GEOGRAPHICAL THOUGHT

Learning Objective

- 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.
- To provide the knowledge on the quantitative revolution in the geographical studies.

Learning Outcomes

- After the completion of the course, Students will be able to
- Understand the evolution of geography over the decades.
- Students will demonstrate an advanced understanding of the historical development of geographical studies.
- They can understand the major current philosophical and theoretical debates in geography.
- Students will demonstrate an understanding of current research with in the breadth of geography, as well as more in depth knowledge of research in their specialty areas.
- Students will develop a solid understanding of the concepts of “space," “place” and “region” and their importance in explaining world affairs.
- Improve knowledge on the quantitative revolution in the geographical studies.

SYLLABUS

Unit I : Ancient Geography – Contributions of Greeks and Romans Medieval Geography– contributions of Arab Geographers, Modern Geography– Contribution of Immanuel Kant, Alexander Von Humboldt and Carl Ritter.

Unit II : Contributions of German Geographers : Friedrich Ratzel, Ferdinand Von Ritchthofen, Albrecht Penck and Alfred Hettner and French geographers: Vidal de la blache, Elisee Reclus, Jean Brunhesand Emmanual de Martonne. Asian geographers with special reference to Indian geographers

Unit III : Dualism in Geography-Systematic and regional Geography. Determinism and Possibilism; Geography as a natural science and social science.

Unit IV : Quantitative revolution–causes and consequences. Behavioral geography. Laws, Theories and Models in Geography.

Suggested Readings

1. Dikshit, R.D. (ed.): The Art & Science of Geography – Integrated Readings, Prentice Hall of India, New Delhi,1994.
2. Hartshome, R.:Perspective on nature of Geography, R and Me Nally & Co., 1959.
3. Husain, M.:Evolution of Geographic thought, Rawat Pub., Jaipur, 1984.
4. Minshull, R.: The Changing nature of Geography, Hutchins on University Library, London, 1970.

GEG-CC-202-5B-PHYSICAL GEOGRAPHY OF INDIA

Learning objectives:

- To develop the understanding about physical features of Indian Geography.
- To familiarize the students with physiography, Drainage, Climate, soil and natural vegetation of India.

Learning Outcomes

- After the completion of the course, Students will be able to
- Conceptualize the elements of physical features of Indian geography.
- Visualize and recognize the major topographical, geological, soil and natural vegetation regions of India.
- examine the various issues, problems and challenges associated with these physical regions.

SYLLABUS

Unit I : Physiography: Major Physiographic Divisions of India; Extra- Peninsula: Its Structure Relief and the Evidences Regarding its Present Day Evolution; Evolution, Structure and Relief; of Peninsula, Indo Gangetic Plain, Western Coast, Eastern Coast and Islands.

Unit II : Drainage System: Himalayan and pen insular drainage-The Indus, Brahmaputra, Ganga the Godavari and Krishna River Systems; differences between the Himalayan and Peninsular Drainage.

Unit III : Climate: Origin and Mechanisms of Indian Monsoon – Classical and Modern Views of origin; Effects of El-Nino and La-Nina on Indian Monsoon. Koppen's and Thornth waite classification of Indian Climate.

Unit IV : Soils and Forest: classification, erosion and conservation; Saline and Alkaline Soils – measures of reclamation; Problems and developmental programs of Indian Forestry.

Suggested Readings:

1. Spate, O.H.K., & Learrmonth, A.T.A., India & Pakistan, London.
2. Puri, G.S., Indian forest Ecology, New Delhi.
3. Ray Chaudhary, S.P. Land and soil, New Delhi
4. The Gazetteer of India Vo1,.1
5. Krishnan, M.B.: Geology of India, Higginbothams, Madras.
6. Das, P.K., The Monsoon, New Delhi
7. Wadia, D.N., Geology of India, London.
8. Memoria, C.B.: Economic and Commercial Geography of India, Shirlal Agarwal and Co., Agra, 1991.
9. Alam, S.M.: Planning atlas of Andhra Pradesh.
10. Khullar: India, A comprehensive Geography. Kalyani Publishers, New Delhi.1989.

GEG-CC-203-6A-REGIONAL PLANNING

Learning objectives:

- To apprise the concept of Region and its planning.
- To explains the types of regions and regional hierarchy.
- To explains the types of regional planning and planning process.
- To the people participation in planning process and role of Panchayat Raj system
- To explain the resource based and physiographic based regional planning.

Learning Outcomes:

- After the completion of the course, Students will be able to
- Acquire a solid base of knowledge in the principles and practices Regional planning.
- The skills necessary for the effective practice of planning, including its purpose, meaning elements of plans; adoption, administration, and implementation of plans.
- Develop the values necessary for the effective practice of planning, including problem-solving skills; research skills; written, graphical, and oral skills; computational skills.
- Learn the values and ethical standards affecting the practice of planning.

SYLLABUS

Unit I : Concept of Region; Changing concept of the region from an inter - disciplinary view – point; concepts of regionalism and regionalization. Types of Regions: Formal and functional, uniform and Nodal, single purpose and composite regions, regional hierarchy and special purpose regions.

Unit II : Types of Planning; Sectoral, temporal; short term, long term and Multilevel planning and planning process.

Unit III : Decentralised Planning: Peoples participation in the Planning process; Panchayathi Raj system.

Unit IV : Physical resource and special purpose regions: River valley regions, hilly and tribal regions, drought prone regions and metropolitan regions. Role of Geospatial techniques in Regional Planning.

Suggested Readings

1. Sundaram, K.V. : Urban and Regional Planning, Vikas Publishing house, New Delhi, 1977.
2. Misra, R.P. and Sundaram, K.V. : Rural Area Development, Sterling Publishers, New Delhi, 1979.
3. Misra, R.P., Urs, D.V. and Nataraj, V.K. : Re gional Planning and National Development, Vikas Publishers, New Delhi, 1978.
4. Misra, R.P. : Regional Planning Concepts, Techniques and case studies, Prasaranga Press, University of Mysore, Mysore, 1969
5. Sengupta, P. and Galina Sdasyuk : Economic Regionalisation of India: Problems and Approaches, Census of India, Monogram, New Delhi, 1968.
6. Planning Dept. Government of Andhra Pradesh : Planning and Development of Backward Regions – A Case Study of Rayalaseema.
7. Mishra, R.P. et al. Multi -Level Planning : Heritag e Publishers, Delhi, 1980.
8. Bhat, L.S. et al. Micro -Level Planning : A Case Study of Kamal Area, Haryana, K.B Publications, New Delhi, 1976.
9. Friedmann, J. and Alonso, W. : Regional Development and Planning– A Reader, M.I.T. Press, Cambridge Mass, 1967.
10. Kuklinski, A.R. (ed.) : Growth Poles and Growth Centres in Regional Planning, Mouton, The Hague, 1972.

GEG-CC-203-6B-REGIONAL GEOGRAPHY OF INDIA

Learning objectives:

1. To explain practical knowledge on Regional aspects of India...
2. To help to understand Indian mineral resources and their distribution..
3. To illustrate Indian agriculture and cropping techniques.
4. To acquaint knowledge on allocation of RS in different fields and sectors.

Learning Outcomes:

1. After the completion of the course, Students will be able to
2. Explain practical knowledge on Remote sensing applications...
3. Understand Visual and digital interpretation of satellite Images.
4. Illustrate interpretation of Aerial photos. Acquaint knowledge on allocation of RS in different fields and sectors

SYLLABUS

Unit I : Location and Geographical Setting of India – Major Physiographic Divisions, Soils, Vegetation, Drainage. Climatic Regions and their Characteristics in India.

Unit II : India: Mineral Resources – Coal, Iron ore and petroleum, Industries: Iron and Steel, Oil refinery and Paper industries; Industrial Regions of India.

Unit III : India: Population Distribution; Density growth problems, over population and population policies in India; Agriculture Types; Irrigation and Power; Multipurpose projects. Major food grain crops; Rice and Wheat; Major commercial crops – Coffee and Tea.

Unit IV : Transport; Land, Water and Air, Imports and Exports. concept of Swatch Bharath.

Suggested Readings

1. Spate, O.H.K. and Learmonth, A.T.A. India and Pakistan, Third Edition, Methuen, London, 1967.
2. Memoria, C.B. : Economic and Commercial Geography of India, S hirlal Agarwal and Co., Agra, 1991.
3. Krishnan, M.B. : Geology of India, Higginbothams, Madras.
4. Alam, S.M. : Planning atlas of Andhra Pradesh.
5. Khullar: India, A comprehensive Geography. Kalyani Publishers, New Delhi.1989

GEG-204-PRACTICAL-III-INTERPRETATION O F TOPOGRAPHICAL AND WEATHER MAPS

Learning objectives

- To provide understanding and interpretation Skills of different Topographical maps.
- To improve the knowledge on Indian weather maps and Interpretation skills.

Learning outcomes

- After the completion of the course, Students will be able to
- 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

Unit I : Indian Topographical Maps-introduction, Numbering Importance and usage
Unit II : Interpretation of physical features and culture features Survey of India (SOI) Toposheets
Unit III : Interpretation of Physical features, Cultural features U.S. and O.S. Toposheets.
Unit IV : Interpretation of Weather maps (India): elements and interpretation.

Suggested Readings

1. John Bygott : An introduction to map work and practical geography, University Tutorial Press Ltd., London, 1974.
2. Mishra, R.P. and Ramesh, A. : Fundamentals of Cartography, Concept, New Delhi, 1989.
3. Singh, R.L.: Map work and practical geography, control Book depot, Allahabad, 1972.

GEG-SOC-205-3A-GEOGRAPHICAL INFORMATION SYSTEM (GIS)

Learning objectives:

1. To understand the evolution of GIS.
2. To focus on collection, analyzing, interpretation and resenting the data related to Earth.
3. To explains the types of data collection with respective to time and terrain and Data base management and retrieving the data from different sources.
4. To provides the theoretical knowledge on the Modeling surfaces and integration of Remote sensing with GIS.
5. To provide knowledge on GIS applications in different sectors.

Learning Outcomes:

- After the completion of the course, Students will be able to
- Understand the evolution of GIS.
- focus on collection, analyzing, interpretation and resenting the data related to Earth.
- Differentiate the types of data collection with respective to time and terrain and Data base management and retrieving the data from different sources.
- Improve knowledge on the Modeling surfaces and integration of Remote sensing with GIS.
- Develops knowledge on GIS applications in different sectors.

SYLLABUS

Unit I : GIS: Definitions and Development – Computer Components of GIS (Hardware and Software) – General Data Base concepts of Spatial and Non - spatial data - Elements of Spatial data - Sources of Spatial data– Data quality for GIS – Errors and Error variations in GIS.

Unit II : GIS Data Management: Data Base Management Systems (DBMS) Data Base Models. Data input methods – Spatial Data structures: Raster data and Vector data – Structures – GIS Data Analysis: Spatial measurement methods Reclassification – Buffering – Overlay Analysis.

Unit III : Modelling Surfaces: Generation of DEM, DTM and TIN models – Spatial Interpolation – GIS output generation – Integration of Remote Sensing and GIS Principles of Global Positioning System (GPS).

Unit IV : GIS applications: GIS as a Decision Support System – GIS as a Land Information System – GIS as a Disaster Management and Emergency Response System - Resource management applications - Facility Management application – Urban Management application.

Suggested Readings

1. Aronoff S. Geographic Information System : A Management Perspective, DDL Publication, Ottawa. 1989.
2. Burrough P.A. Principles of Geographic Information Systems for Land Resource Assessment. Oxford University Press, New York, 1986.
3. Fraser Taylor D.R. Geographic Information System. Pergamon Press, Oxford, 1991.
4. Maquire D. J.M.F. Goodchild and D.W. Rhind (eds.) Geographic Information Systems : Principles and Application. Taylor & Francis, Washington, 1991.
5. Mark S. Monmonier. Computer–assisted Cartography. Prentice–Hall, Englewood Cliff, New Jersey, 1982.
6. Peuquet D.J. and D.F. Marble, Introductory Reading in Geographic Information Systems. Taylor & Francis, Washington, 1990.
7. Star J. and J. Estes. Geographic Information Systems : An Introduction. Prentice Hall, Englewood, Cliff, New Jersey, 1994.

GEG-SOC-205-3B-BASIC RESEARCH FOR GEOGRAPHERERS

Learning Objectives

- To understand the basic concept of research, types and its methods
- To provide suitable steps of the Research Design.
- To give an idea of data collection and its processing methods.

Learning Outcomes:

- On completion of the course the student will:
- Understand some basic concepts of research and its methodologies.
- Search for, select and critically analyse research articles and papers.
- Prepare literature review Formulate and evaluate research questions.
- Develop a research proposal or industry project plan.
- Gain experience with instrument development and data collection methods
- Gain experience with ethics proposals.
- Organize and conduct research (advanced project) in a more appropriate manner.
- Students will strengthen their ability to write academic papers, essays and summaries using the process approach.
- Students will heighten their awareness of correct usage of English grammar in writing and speaking.

SYLLABUS

Unit I : Research: Meaning – Need for scientific research – types of research – approaches to geographical research; traditional and scientific – identification of fields, sub field and themes.

Unit II : Logic in Research: Hypothesis, concepts and facts, principles, law, theory and their implication in geographical research – the science of geography – role of models – research trends in geography. Research Design: Selection of the topic – statement of the problem – formulation of hypothesis, testing of hypothesis – time schedule – literature survey – role of internet – bibliography.

Unit III : Data Acquisition and Analysis: Collection of data – sources of data; primary and secondary – structuring the data – data transformation – quantitative revolution in geography – quantitative techniques in analysis of data; sampling techniques – correlation, regression – digital elevation model

Unit IV : Thesis/Dissertation Writing: Organization of the thesis: The preliminaries, text and reference materials – drafting of thesis – final evaluation – language and presentation (form and style) – writing of abstract, reports – research – research project proposal.

References:

1. Basil Gomez, John Paul Jones., (2010). Research Methods in Geography: A Critical Introduction, John Wiley & Sons, New York.
2. Business Research Methods- Alan Bryman & Emma Bell, Oxford University Press.
3. C.R.Kothari,C.R,(2019) Research Methodology, Fourth Revised Edition, New Age international (p) Ltd., Piblication. New Delhi.
4. Daniel Montello, Paul Sutton, (2006). An Introduction to Scientific Research Methods in Geography, SAGE.
5. Goyal, R. (2010). Research Methodology for Health Profession. India: Jaypee Brothers Medical Publishers Pvt. Limited.
6. Handbook of Research on Advanced Research Methodologies for a Digital Society. (2021). United States: IGI Global.
7. Sinha, S.C. and Dhiman, A.K., (2002) Research Methodology, Ess Ess Publications. 2 volumes.

GEG-SOC-206-4A-GLOBAL POSITIONING SYSTEM (GPS) AND GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)

Learning objectives:

- To develop the skill of understanding GPS.
- To create awareness on post processing of GPS data and collection of data from.
- To develop skill of report writing by using GPS data and software and hardware.
- To Develop the skill of understanding GNSS

Learning Outcomes:

- After the completion of the course, Students will be able to
- Develop the skill of understanding GPS.
- 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.
- Develop the skill of understanding GNSS.

SYLLABUS

Unit I : Global Positioning System (GPS) - Basic concept, system architecture, space segment, user segment; GPS Signals:- Signal structure, selective availability; GPS coordinate frames Time references: Geodetic and Geo centric coordinate systems, world geodetic 1984 (WGS 84), GPS time.

Unit II : GNSS Surveying Techniques - Point positioning and differential positioning, DGPS and SBAS; Relative positioning: Static - Rapid static and Pseudo kinematic; kinematic positioning - pure kinematic, semi kinematic and real time kinematic (RTK) methods of observations. Real time network (VRS) services.

Unit III : NAVSTAR - Global Positioning System, Global Navigation Satellite System (GLONASS), BeiDou Navigation Satellite System (BDS), Indian Regional Navigation Satellite System (IRNSS) and GALILEO Quasi-Zenith Satellite System (QZSS). GNSS applications to Global, Regional and Local issues: IUGG, IAG, IGS and IERS services.

Unit IV : GPS Applications - Field Data collection, Navigation, Aviation, Marine, Rail, Roads and highways, Space, Survey mapping, Defense, Agriculture, Environment.

Suggested Readings:

1. Bailey, T. and Gatrell, A. C. (1995): Interactive Spatial Data Analysis. Longman, Harlow.
2. Dorling, D. and Fairborn, D. (1997): Mapping. Ways of Representing the World.
3. Longman, Harlow.
4. Fraser Taylor, D.R. (1980): The Computer in Contemporary Cartography. John Wiley and Sons, New York.
5. Fraser Taylor, D.R. (ed.) (1983): Graphic Communication and Design in Contemporary Cartography. John Wiley and Sons, New York.
6. Kanetkar, T.P. and Kulkarni, S.V. (1967): Surveying and Levelling, Part II, A.V.G. Prakashan, Poona.
7. Keates, J.S. (1973): Cartographic Design and Production, Longman Group Ltd.
8. Mailing, D.H. (1973): Co-ordinate Systems and Map Projections. George Philip and Sons Ltd.
9. Rhind, B. and Adams, T. (ed.) (1983): Computers in Cartography. British Cartographic Society, London.

GEG-SOC-206-4B-ADVANCE SURVEYING TECHNIQUES

Learning Objective

- To provide a comprehensive understanding of surveying techniques, GNSS, and geodesy, equipping students with the skills to apply modern geospatial technologies for precise measurements and environmental studies.

Learning Outcomes:

- On completion of the course the student will:
- Understand some basic concepts of Fundamentals of Surveying
- Obtain knowledge on Total station and GNSS
- Develop GNSS Surveying Techniques
- Gain experience with NAVSTAR - Global Positioning System awareness of correct usage of English grammar in writing

SYLLABUS

Unit I : Fundamentals of Surveying - Definition - Classifications - Basic principles - Equipment and accessories for ranging and chaining - Chain surveying - Compass surveying - Types - Bearing - System and conversions - Levelling - Plane table and its accessories - Plane table surveying - Theodolite surveying .

Unit II : Introduction to Total station and GNSS - Methods of Measuring Distance - Basic Principles of Total Station - Historical Development, Classifications, applications and comparison with conventional surveying – GNSS Basic Concepts - Components of GNSS, Types of GNSS receivers, Pseudo Range Measurement, Phase Difference Measurement, Sources of GNSS errors, Transformation of coordinates, GNSS Remote Sensing.

Unit III : GNSS Surveying Techniques - Point positioning and differential positioning, DGPS and SBAS; Relative positioning: Static - Rapid static and Pseudo kinematic; kinematic positioning - pure kinematic, semi kinematic and real time kinematic (RTK) methods of observations. Real time network (VRS) services.

Unit IV : NAVSTAR - Global Positioning System, Global Navigation Satellite System (GLONASS), BeiDou Navigation Satellite System (BDS), Indian Regional Navigation Satellite System (IRNSS) and GALILEO Quasi-Zenith Satellite System (QZSS). GNSS applications to Global, Regional and Local issues: IUGG, IAG, IGS and IERS services.

REFERENCE:

1. Gopal Singh Map Work and Practical Geography, 3rd edition, Vikas Publishing House New Delhi,
2. Gupta K.K and Tyagi V.C Working with maps Survey of India Department of Science and Technology, Govt. of India, Dehra Dun 1992.
3. Mishra R.P Fundamentals of Cartography1969, Prasaranga, University of Mysore, Mysore
4. Punmia P.C Surveying, Laxmi publication, New Delhi, 2005. 5 Rampal Surveying, Mittal Publication, Merat, 2002 5 Singh. R.L Elements of Practical Geography Kalyani Publishers, New Delhi, 1979.

GEG-207-PRACTICAL-IV-GEOGRAPHICAL INFORMATION SYSTEM (GIS)

Learning objectives:

- To acquaint knowledge the about especially Geographic Information System (GIS) software.
- To develop the skill of geo-referencing and creation of different data files.
- To improve the practical knowledge on attribute data and linkage.
- To develop the skill on analysis methods of GIS.

Learning Outcomes:

- After the completion of the course, Students will be able to
- Acquaint knowledge the about especially Geographic Information System (GIS) software.
- Develop the skill of geo-referencing and creation of different data files.
- Improve the practical knowledge on attribute data and linkage.
- Develop the skill on analysis methods of GIS.

Unit I : GIS Capabilities

Unit II : Introduction to ARC GIS Software

(a) Arc Map (b) Arc Catalogue

(c) Arc Tool box (d) TABLE of Contents

(e) Arc Scan

Unit III : Geo-Referencing.

Unit IV : Creation of File Geo data base, Personal Geo -data base, shape file. – Data Base generation – Spatial data generation – Digitization (Polygon, line and point) and Non -spatial data. Buffering

Suggested Readings

1. Ian Heywood et al. An Introduction to Geographical Information Systems, Addison Wesley Longman Ltd. 1998.
2. Mishra, H.C.; GIS Handbook, GIS India, Hyderabad, 1996.
3. Peter A. Burrough and Rachael A. McDonnell; Principles of Geographical Information Systems; Oxford University Press, New York, 1998.
4. Star J and J. Estes; Geographic Information Systems; An Introduction, Prentice Hall, Englewood Cliff, New Jersey, 1994.

Audit Course
GEG-209 - Indian Knowledge Systems – 2

Learning Objectives:

1. To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the importance of roots of Indian Knowledge System.
2. To help student to understand the knowledge, art and creative practices, skills and values in ancient Indian system.
3. To make students acquaint with the facets of traditional knowledge& their relevance and help them be able to apply it to their day to day life.

Learning Out comes:

1. At the end of the course, students will be able to gain insights into the concept of traditional knowledge and its relevance.
2. They will also be able to understand and connect up the basics of Indian traditional knowledge with modern perspective.
3. Apply traditional knowledge for sustainability

SYLLABUS

Unit I : Diversity and Indian Culture: Diversity and Indian Culture; Indigenous Faith and Religion; Preservation of culture and indigenous knowledge .

Unit II : Indian Calendar: Panchanga. Adhikamasas. Solar and Luni-Solar systems.Solar and Lunar Eclipses Angular diameters of the Sun, Moon and Earth's shadow. Possibility of eclipses. Finding the middle of an eclipse by iteration. Amount of obscuration at any time.

Unit III : Indian Architecture and Town Planning: Introduction ancient Indian architecture; Sthapatya-Veda: An Introduction; Indigenous tools & techniques for town planning & Temple Architecture. Lothal, Mohan Jo Daro; Temple Art: Lepakshi Temple, Jagannath Puri Temple, Konark Sun Temple.

Unit IV : Indian Agriculture: Significance in Human Civilization; Sustainable Agriculture; Historical significance of agriculture and sustainable farming in India; Step Cultivation of India: Special reference to Northeast India; Wet rice cultivation of Assam.

Reference Books:

1. Baladev Upadhyaya, Samskrta Śāstrom ka Itihās, Chowkhambha, Varanasi, 2010.
2. D. M. Bose, S. N. Sen and B. V. Subbarayappa, Eds., A Concise History of Science in India, 2nd Ed., Universities Press, Hyderabad, 2010.
3. Astāngahrdaya, Vol. I, Sūtrasthāna and Śarīrasthāna, Translated by K. R. Srikantha Murthy, Vol. I, Krishnadas Academy, Varanasi, 1991.
4. Dharampal, The Beautiful Tree: Indian Indigenous Education in the Eighteenth Century, Dharampal Classics Series, Rashtrotthana Sahitya, Bengaluru, 2021.
5. Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavan RN. (2022), Introduction to Indian Knowledge System: Concepts and Applications. PHI Learning Private Ltd.
6. Mukul Chandra Bora, Foundations of Bharatiya Knowledge System. Khanna Book Publishing
7. D. M. Bose, S. N. Sen and B. V. Subbarayappa, Eds., A Concise History of Science in India, 2nd Ed., Universities Press, Hyderabad, 2010.
8. Textbook on The Knowledge System of Bhārata by Bhag Chand Chauhan,
9. M. S. Sriram, Man and the Universe- An elementary account of Indian Astronomy, (Unpublished 1993).

SEMESTER-III
GEG-CC-301-7-Urban Geography

Learning objectives:

- 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

Learning outcomes:

- Learning 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
- Explains the theories involved in classifications of towns and relationship between towns and cities and their population.
- Distinguish patterns of World urbanization with reference to India.

SYLLABUS

Unit I : Urban Geography: Definition, Nature and scope. Urban growth, structure and slums. Definition of Urban settlements, Impact of the Industrial revolution on location, spacing and size of urban settlements

Unit II : Origin and evolution of cities: Ancient, Medieval and Modern cities. Primate city, Metropolis; Megalopolis and Conurbation, The concept of Smart Cities and Satellite towns, Patterns of towns and cities.

Unit III : Urban Hierarchy, Rank–size rule, Nearest Neighbor analysis, Classification of towns-Functional classification of towns. Theories of Urban Morphology-Concentric Zone, Multiple-nuclei, Central Place and Sector Theory.

Unit IV : Rural – urban relationships, rural - urban fringe, urban decay, urban sprawl urban renewal. The concept of city–region: Urban Um-land and hinterland; Pattern of world urbanization with special reference to India and Andhra Pradesh.

Suggested Readings

1. Johnson, J.H., Urban Geography. An Introductory Analysis, Pergaman Press, Oxford, 1967.
2. Murphy,R.:TheAmericanCity:anUrbanGeographyMcGrawHill,1966.
3. Dickinson,R.E.:CityandRegion,RoutledgeandKegen,PaulLtd.,London,1964
4. Mayer and Cohen: Readings in Urban Geography, Central Book Depot., Allahabad
5. R.B. Mandal, Urban Geography: A text book; Concept publishing Company, New Delhi- 110059, 1998.
6. Dr.S.C. Bansal, Urban Geography: Meenakshi Prakashan, Begum bridge, Meerut
7. Dr.S.D. Maurya, Urban Geography: Sharda Pustak Bhawan, Publisher & Distributors, University road Allahabad-211002(U.P), 2017.

GEG-CC-302-8A-PRINCIPLES OF REMOTE SENSING

Learning Objective

- To focus on history and evolution of Remote sensing.
- To explains the principle involved in remote sensing i.e. the Electromagnetic spectrum, reflection, refraction, diffusion, absorption and interaction with earth's atmosphere.
- To give the technical knowledge of satellite system.
- To provide knowledge on the platforms and instruments used for remote sensing.
- To give light on Areal Remote sensing and satellite Remote sensing.
- To explains about the specifications of sensors.

Learning Outcomes

- After the completion of the course, Students will be able to
- Understand the principles of remote sensing and its techniques.
- Student will be able to know the apply the technique of remote sensing in varies fields.
- Student can apply the knowledge in getting authentic data by performing pre and post analysis in aerial remote sensing.
- Student will analysis the changes on earth surface with the image interpretation and visual interpretation techniques.
- With the sound knowledge on the process, principles, effecting factors, techniques of Remote sensing student can understand interpretation of the data in much more ccurate.

SYLLABUS

Unit I : Introduction to Remote Sensing: History, Development and Principles. Stages in Remote sensing Process. Energy Sources and Radiation Principles-Energy Interaction in the Atmosphere. Atmospheric Windows. Energy Interaction with Earth Surface features. Electromagnetic Spectrum. Spectral reflectance patterns of Earth surface features in different wavelengths.

Unit II : Thermal Remote Sensing: Thermal sensors and characteristics, Interpretation of thermal images, Emissivity conservation, Thermal inertia considerations, Factors effecting analysis of thermal images. Estimation of land surface temperature.

Unit III : Microwave Remote Sensing: Intraduction, Sensors Spatial Resolution in RADAR Azimuthal Resolution, Synthatic Aperture Radar, Radar Return and Image Signatures, System Properties, Polarization, Incidence angle, Terrain Properties. Radar Image Charecterstics Interpretation of Radar Images.

Unit IV : Satellite Remote Sensing: Types of Satellites, Orbits: Types of Orbits, and Orbital Characteristics. Platforms: types of Platforms in Remote sensing. Sensors- Definition, Types of Sensors in Remote sensing. Scanning mechanism. Resolutions: Definition, Spectral, Spatial, Temporal and Radiometric resolutions of Satellites. Characteristics of Indian Remote Sensing Satellites (I.R.S)

Suggested Readings

1. American Society of Photogrammetry: Manual of Remote Sensing, ASP, Falls Church, V.A.1983.
2. Barrett, E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York,1992.
3. Compbell, J.: Introduction of Remote Sensing, Guilford, New York, 1989.
4. Curran, Paul, J.: Principles of Remote Sensing, Longman, London, 1985.
5. Leuder D.: Aerial Photographic Interpretation: Principles and Application, McGraw Hill, New York, 1959.
6. Rao D.P. (eds.): Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hyderabad, 1998.
7. Thomas M. Lillesand and Ralph W. Kefer, Remote Sensing and Image Interpretation. John Wiley & Sons, New York, 1994.

GEG-CC-302-8B- WATER AND SOIL RESOURCES MANAGEMENT

Learning objectives:

- To apprise the students to various water resources related aspects and hydrological cycle.
- To focus on ground water and soil specifications.
- To develop skill of water and soil management and to study on some case studies.

Learning Outcomes:

- After the completion of the course, Students will be able to
- Apprise the students to various water resources related aspects and hydrological cycle.
- Focus on ground water and soil specifications.
- Develop skill of water and soil management and to study on some case studies.

SYLLABUS

Unit I : Water as a focus of geographical interest, Inventory and distribution of world's water resources (Surface and Subsurface); World Hydrological cycle; precipitation and its Measurement, water balance studies.

Unit II : Groundwater: Origin, Occurrence and Vertical distribution; water quality: Physical, biological and chemical properties for irrigation, domestic and industrial purposes.

Unit III : Water Resources Management: conjunctive use of surface and ground water resources; watershed management. Methods of irrigation. Water harvesting techniques: Neeru–Chettu and Water percolating programmes.

Unit IV : Soils: Process of soil formation and soil development. Soil profile development. Properties of soil – Physical, morphology, texture structure and chemical properties. Soil erosion– degradation and conservation Management of saline and alkaline soils.

Suggested Readings

1. Dakshinamur thy, C. et al., Water Resources of India and their utilization in Agriculture, Indian Agriculture Research Institute, New Delhi, 1973.
2. Bunting, B.T. : The Geography of Soils; Hutchinson, London, 1973.
3. Foth, H.D and Turk, L.M. : Fundamentals of Soil Science s, John Wiley, New York, 1972
4. Jones, J.A. : Global Hydrology : Processes, Resources and Environmental Management, London, 1997.
5. Matter, J.R. Water Resources Distribution, Use and Management, John Wiley, Marylane, 1984.
6. Singh, R.A and Singh, S.R. Water Man agement. Principles and Practices, Tara Publication, Varanasi, 1979.
7. Tideman, E.M. Watershed Management : Guidelines for Indian Conditions, Omega, New Delhi, 1996.
8. Todd, D.K.: Ground Water Hydrology, John Wiley, New York, 1959.
9. Sarma, Hydrdogy, Dhanpat Roy & Sons, New Delhi.

GEG-CC-303-9A- DISASTER MANAGEMENT STUDIES

Learning Objectives:

- To develop the skill of understanding about natural calamities and disaster and also realize the consequences as well as preparedness.
- To create awareness on human and natural disasters
- To understand classification of disasters and its impacts

Learning Outcomes:

- After the completion of the course, Students will be able to
- Develop the skill of understanding about natural calamities and disaster and also realize the consequences as well as preparedness.
- Improve awareness on human and natural disasters
- Understand classification of disasters and its impacts and management of disasters

SYLLABUS

Unit I : Disaster: Meaning and Concept, types of Disasters. Natural disasters: Earthquakes – Hazardous effects, Volcanic eruptions – Hazardous effects. Certain case studies.

Unit II : Cyclones and floods: cyclone related parameters and effects on land and sea-damage assessment. Causes of flood and flood prone area analysis– damage assessment. Certain case studies.

Unit III : Droughts and desertification: Types of droughts – factors influencing droughts – land use and groundwater level changes – delimiting drought prone areas. Main induced disasters: Deforestation and environmental degradation, urbanization, industrial development and environmental pollution. Types of pollution: air pollution, water pollution, land / soil pollution and sound / noise pollution.

Unit IV : Disaster management: Pre and post disaster operations of Earthquakes, cyclones, floods, droughts, forest firs. The role of GIS in disaster management studies.

Suggested Readings

1. Savindra Singh, Environmental Geography, Prayag Pintak Bhavan, Allahabad, 2006.
2. Singh, L.R., Singh, Savindra, Tiwari, R.C. and Srivastava, R.P.: Environmental Management (edited), Allahabad University, 1983.
3. Singh, Savindra : Flood hazards and environmental degradation; A case study of the Gomathi River, in environmental management, Allahabad University, 1983.
4. John, A. Mattlews : Natural hazards and environmental change. Bill Mcguire, Ian Mason, 2002.
5. Nimpuno, K : Disasters and Social Response, ITC, 1989.
6. Hooja, R. and Joshi, R. : Desert, Drought and Development Studies in Resource Management and Substainability: Rawat Publications, Jaipur, 1994.
7. Aronaff, S : Geographic Information Systems; A Management Perspective, DDL Publications, Ottawa, 1989.
8. Barrett, E.C. and Curtis, L.F.: Fundamentals of Remote Sensing and Air photo interpretat ion, Mcmillan, New York, 1992.
9. Bring, N., Dhal and Ms. Sunita Dhal : Can GIS and Disaster Management System help, GIS India? Vol.9, No.1, January -February, 2000.

GEG-CC-303-9B - AGRICULTURAL GEOGRAPHY

Learning objectives:

- 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.
- To understand agricultural location theories also the problem and prospects of Indian Agriculture.

Learning Outcomes:

- After the completion of the course, Students will be able to
- 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.

SYLLABUS

Unit I : Nature, Scope, significance and development of Agricultural Geography. Approaches to the study of agricultural geography; Origin and evolution of agriculture.

Unit II : Determinants of agriculture – Physical, Socio -economic, technological and political; concepts and methods of land use classification.

Unit III : Concepts and methods of Agriculture: Crop combination; Crop concentration; crop diversification; agricultural productivity; agricultural typology.

Unit IV : Agricultural location theory – Von Thunen and its modifications. Concepts of agricultural region and agricultural regionalization. Whittlesey's agricultural systems of the world. Agricultural regions of India. Green revolution; Problems and prospects of Indian agriculture.

Suggested Readings

1. Bayliss Smith, T.P. : The Ecology of Agricultural Systems. Cambridge University Press, London, 1987.
2. Berry, B.J.L. et al. : The Geography of Economic Systems. Prentice Hall, New York, 1976.
3. Dyson, T. : Population and Food – Global Trends and Furure Prospects. Routledge, London, 1996.
4. Gregor, H.P. : Geography of Agriculture. Prentice Hall, New York, 1970.
5. Grigg, D.B. : The Agricultural Systems of the World. Cambridge University Press, New York, 1974.
6. Hartshorn, T.N. and Alexander, J.W. : Economic Geography. Prentice Hall, New Delhi, 1988.
7. Morgan, W.B. and Norton, R.J.C.: Agricultural Geography. Mathuen, London, 1971.
8. Singh, J. and Dhillon, S.S. : Agricultural Geography, Tata McGraw Hill Pub., New Delhi, 1988.
9. Tarrant, J.R : Agricultural Geography. Wiley, New York, 1974.

GEG-304-PRACTICAL-V-TECHNIQUES OF MAPPING

Learning Objective

- To apprise the students about the Terrain mapping techniques
- To project the representation of the landforms by using contour lines
- To explains 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

Learning Outcomes

- After the completion of the course, Students will be able to
- Students can able to Represent the landforms with contour lines
- Student can perform profiles which are drawn from landforms through contours
- Student can represent the slope analysis models
- Students can able to understand how to represent the data through different diagrams and graphs

Unit I : Bar Diagrams : Simple, Compound, Superimposed.

Unit II : Graphs Trilinear, Semi -log; Log-log.

Unit III : Diagrams : Pyramid, Pie.

Unit IV : Hyther -graph, Climograph, Ergo -graph, Band -graph. Thematic mapping : Dot method, isopleths and iso -chromatic methods; choropleth and choro -chromatic methods; flow method.

Suggested Readings

1. John Bygott: An introduction to map work and practical geography; University Tutorial Press Ltd. London, 1974.
2. Monk House, F.J.H.R. and Wilkinson : Maps and Diagrams; Methuen and Co., London, 1984.
3. Peter Toyne and Peter Newby, T. : Techniques in Human geography; Macmillan, London, 1972.

GEG-SOC-305-5A-RESEARCH TECHNIQUES OF GEOGRAPHYICAL STUDIES

Learning objectives

- 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.
- To sensitize the different Research and agricultural techniques.

Learning outcomes:

- After the completion of the course, Students will be able to
- 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 to day needs. Use different agricultural methods in their research and needed situations

SYLLABUS

Unit I : Introduction to Research Techniques.
Unit II : Network analysis: Alfa, Beta, Gama, Eta, Theta indices, Centrality, Connectivity, shortest path matrix analysis
Unit III : Nearest neighbor distance analysis, Detour index
Unit IV : Drainage basin morphometry Crop combination Techniques

Suggested Readings

1. Gregory, K.J. and Walling, D.E. Drainage basin form and process: A Geomorphological approach; Amold; London 1973.
2. Peter Davis: Science in geography, Science Series – 3, Data description and presentation, Ox ford University Press, London, 1975.
3. Peter Toyne and Peter Newby, T.: Techniques in Human geography, Mac Millan, London, 1972.
4. Peter Toyne and Peter Newby, T. : Techniques in Physical geography; Mac Millan, London, 1972.
5. Singh Jasbir and Dhillon, S.S. : A gricultural geography, TATA Mc Graw Hill, New Delhi, 1984.
6. Singh, R.L. Mapwork and practical geography, central book depot, Allahabad, 1972.

GEG-SOC-305-5B-3D GEOGRAPHICAL INFORMATION SYSTEM (GIS)

Learning Objectives

Become familiar with Arc GIS 3D user interface.
Understand the fundamentals concepts and features of Arc GIS
Use tools in Arc GIS to prepare 3Dmodels and analyze the GIS data

Learning Out Comes..

Students get Knowledge for preparation of 3D models by using Softwares and Tools
Student can ability to Spatial data analysis
Students individually get knowledge to do project works and research

SYLLABUS

Unit I : Introduction of 3D GIS, GPS Data for using 3Dmodels,Digital Elevation Model Remote sensing technologies to obtain a DEM, Open source DEM products Access to Arc GIS Pro software

Unit II : 3D Feature and Elevation Raster Analysis,3D feature data and analysis DEM processing and analysis, Volumetric analysis ,Visualizing 3D feature and raster data in Arc Scene, Arc GIS Pro Best practices

Unit III : Watershed Delineation ,Introduction to Watershed, Access open source DEM data from USGS Earth Explorer ,Preparing DEM for watershed analysis, Delineate watershed from DEM (compare to a real river)

Unit IV : Tree Height Analysis from LiDAR Data, Introduction to LiDAR, Process LiDAR data in Arc GIS Pro, Estimate tree canopy height and map tall trees using LiDAR data.

Suggested Readings

1. Anji Reddy, M. 2004: Geoinformatics for Environmental Management.B.S. Publications Chang.T.K. 2002
2. Geographic Information Systems. Tata McGrawHill Heywood.I, Cornelius S, Crver Steve. 2003
3. An Introduction to Geographical Information Systems. Pearson Education Ram Mohan Rao. 2002:
4. Geographical Information Systems. Rawat Publication. Skidmore A.2002:
5. Environmental Modeling with GIS and Remote Sensing. Taylor and Francis Tar Bernhardsen. Geographical Information Systems. John Wiley. Wise S.2002:
6. GIS Basics. Taylor Publications ESRI Map book: GIS the Language of Geography by ESRI-USA ESRI-2004

GEG-SOC-306-6A-ADVANCED REMOTE SENSING

Learning objectives:

- 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.

Learning Outcomes:

- After the completion of the course, Students will be able to
- 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.

SYLLABUS

Unit I : Photogrammetry: Introduction; Geometric elements of vertical photographs; scales of Aerial photographs; scale distortions; Flight planning; Relief displacement; parallax measurement; Orthophotography and rectification – principles and procedures.

Unit II : Digital Image Processing: Introduction to digital image processing; Image processing system characteristics: Hardware and Software; Image restoration Techniques: Restoring line dropouts, Restoring periodic line striping, Restoring line offsets, Filtering random noise; Radiometric corrections and Geometric corrections in image processing.

Unit III : Image Enhancement Techniques: Contrast enhancement, Density slicing, Edge enhancement, Merging data sets, Synthetic stereo images; Digital mosaics. Information extraction techniques: Principal – component (P.C) transformation analysis, Ratio images, Multi spectral classification, Change - detection images.

Unit IV : Remote Sensing Applications to Geographical Studies: Land use/ Land cover mapping; water resources; Geomorphologic, waste land studies, Urban and Regional Planning.

Suggested Readings

1. American Society of Photogrammetry : Manual of Remote Sensing, ASP, Falls Church, V.A. 1983.
2. Barrett, E.C and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation, Mcmillan, New York, 1992.
3. Compbell, J. : Introduction to Remote Sensing, Guilford, N ew York, 1989.
4. Curran, Paul, J. : Principles of Remote Sensing, Longman, London, 1985.
5. Hord, R.M. : Digital Image Processing of Remotely Sensed Data; Academic New York, 1989.
6. Luder D. : Aerial photography Interpretation : Principles and Applications, McGra w Hill, New York, 1959.
7. Pratt, W.K Digital Image Processing, Wiley, New York, 1978.
8. Rao, D.P. (Eds) : Remote Sensing for Earth Resources, Associate of Exploration Geophysicist, Hyderabad, 1998.
9. Thomas, M. Lillesand and Ralph W. Kefer : Remote Sensing and Image Interpretation, John Willey & Sons, New York, 1994

GEG-SOC-306-6B-LANDUSE AND LAND COVER ANALYSIS.

Learning Objectives

- The Course intradoses to students to the statutory and non-statutory components of the planning process
- This includes issues and implications of various planning policies ,tools,role and responsibilities of key stake holders.
- The course provides students with foundation in the planning frame work around the part of the earth or world.

Learning outcomes

- Interpretation of official plans and other relevant local policy documents.
- Identification of appropriate planning instruments to implement land use planning decisions
- Undertake due intelligence and prepare a defensible land use plan

SYLLABUS

Unit I : Definition of Land use and Land Cover, Preparation of base maps from Topographical Maps Remote sensing data -Aerial Photography satellite Images and Google Earth for preparation of land use and land cover maps. GIS and Remote sensing Software's

Unit II : Land use land cover classification systems, Interpretation of accuracy for identifications land use land cover categories from Remote sensing data, topographical maps and Google earth Classification of vegetation soils natural resources, Human Settlements agro climatic zones and agriculture.

Unit III : Land use and land cover change Identifications - settlements, water bodies, population growth, Vegetation, Agriculture, Drainage System Regional and Local Policies. Data comparison for seasonal variation, year wise decade wise and more than decade years.

Unit IV : Assessment of Land use and land cover from urban, Vegetation, Agriculture, Forest and Nature. Land use and land cover analysis – Advantage for researchers, Decision making strategies for administration / government. Role of Remote Sensing and Geographical Information System in Land use Land cover.

Suggested Readings:

Anderson, James R., 1971, Land use classification schemes used in selected recent geographic applications of remote sensing: Photogramm.Eng., V. 37, no. 4, p. 379-387.
Anderson, James R., Hardy, Ernest E., and Roach, John T., 1972, A land-use classification system for use with remote-sensor data: U.S. Geol. Survey Circ. 671, 16 p., refs.
Avery, T. Eugene, 1968, Interpretation of aerial photographs [2nd ed.]: Minneapolis, Burgess Pub. Co., 324 p. Barlowe, Raleigh, 1972,
Land resource economics [2nd ed.]: Englewood Cliffs, N.J., Pre~tice-Hall, Inc., 585 p.
Burley, Terence M., 1961, Land use or land utilization?: Prof. Geographer, v. 13, no. 6, p. 18-20. Clawson, Marion, and Stewart, Charles L., 1965,
Land use information. A critical survey of U.S. statistics including possibilities for greater uniformity: Baltimore, Md., The Johns Hopkins Press for Resources for the Future, Inc., 402 p.

GEG-307-PRACTICAL-VI-REMOTE SENSING APPLICATIONS

Learning objectives:

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.
To acquaint knowledge on allocation of RS in different fields and sectors.

Learning Outcomes:

After the completion of the course, Students will be able to
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

SYLLABUS

Unit I : Techniques of Visual Interpretation

Unit II : Marginal Information of Satellite Imageries

Unit III : Interpretation of Satellite Imageries: Visual Interpretation; Water Resources,

Lineaments, Land use / Land cover – Landforms – Waste Land. Digital Image Interpretation: subset Supervised classification and un Supervised classification, change Detection.

Unit IV : Aerial photo interpretation
1. Vision test – Stereo Test with Stereoscopes
2. Interpretation of Physical Features
3. Interpretation of Cultural Features

Suggested Readings

Curran, Paul, J. : Principles of Remote Sensing: Longman, London, 1985.
Gautam N.C. et al. Space Technology and Geography ; National Remote Sensing Agency, Hyderabad, 1994.
Thomas M. Lillesand and Ralph, W. Keffer; Remote Sensing and images interpretation, John Willey & Sons, New York, 1994.

SEMESTER-IV
GEG-PW– 402- PROJECT WORK-SYLLABUS
Learning Objectives

Evaluate a problem definition.
Determine how to collect information to determine requirements
Perform and evaluate feasibility studies like cost-benefit analysis, technical feasibility, time feasibility and Operational feasibility for the project.
Work on data collection methods for fact-finding
Construct and evaluate data flow diagrams and logical and physical design requirements.
Design and evaluate system outputs and inputs.

Learning Output

Students get knowledge of the project work
Students can capable for t do projects in future
Students can create own tools for design to solving research problems.
Students get experience on using technology

SYLLABUS

Unit I : Project work. Definition of project and project work. Project work based on internship, in the study area project work based on Methodology of study area, Principles of natural resources management, Human resource management, economic and technology management of geographical Research. Study of relevant project works of the research project area.

Unit II : Objectives of Project. Effective objectives. specific, measurable, Attainable relevant Time bound Learning. Reflect on important skills for students to development choose an action verb, ABCD method,
Technical Objectives. Network capabilities, hard ware and software Performance objectives. Project Plan, budget prediction, project process report, Team members task Business Objectives, Financial Objectives, effectiveness, Regularity technical Knowledge quality of the work.

Unit III : Project Design. Basic modules, Data design, schema design, data integrity and constrains, Procedural Design, logic diagrams, data structures, Algorithm design user interface design, Project work related software usage and new tools created to the project work. Suitable quantitative methods using for analysis of project work data of study area.

Unit IV : Project work Implementation. Primary. Secondary and field Data collection of the project thrust area Data storage of a research area in specific duration. Preparation of tables, diagrams interpretation of images analysis, map analysis and models preparation of decision support. Findings, results summary of project work .applications and uses of project for community development and reporting of project..

Suggested Readings

Kennett, B. (2014). Planning and managing scientific research. ANU Press. https://www.jstor.org/stable/j.ctt6wp816 (free access)

Singh, H. (2014). Mastering Project Human Resource Management: Effectively Organize and Communicate with All Project Stakeholders. FT Press.

Andersen, J., Toom, K., Poli, S., & Miller, P. F. (2017). Research Management: Europe and Beyond. Academic Press.

Wingate, L. M. (2014). Project management for research and development: guiding innovation for positive R&D outcomes. CRC press.

Sirotinina, N. (2012). History and methodology of computer science. Siberian Federal University. Tomsk: TPU Publishing House.