SRI VENKATESWARA UNIVERSITY: TIRUPATI
SRI VENKATESWARA UNIVERSITY COLLEGE OF ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course

B.Tech COMPUTER SCIENCE & ENGINEERING

Choice Based Credit System (CBCS)

Academic Year 2017-2018

Vision

To be one of the premier departments for achieving excellence in teaching and research with social responsibility and for producing innovative technical graduates in Computer Science and Engineering.

Mission

To impart Computer Science and Engineering education by utilizing state of the art computing facilities.
To infuse scholarly inquisitiveness, professional behavior and ethical values among students and research scholars, thereby making an imprint in the technological, economic and social development of the nation.
To impart high quality professional training of international standards to meet the current and future demands of the industry and academia.
To develop adequate e-infrastructure, environment and culture for the state of the art research work in Computer Science and Engineering.

About the Department

The Department of Computer Science and Engineering was established in 1986 offering B.Tech Program with initial intake of 20. Now the B.Tech (CSE) intake is increased to 40. The new programme 6 Year B.Tech & M.Tech Dual Degree course was introduced in 2015 . The Department offers the Self –Finance course B.Tech(CSE) and B.Tech (Artificial Intelligence) Programme was introduced in 2021.

The post graduate program i.e. M.Tech (CSE) was started in the year 2005 with initial intake of 18 and now it is increased to 25. The MTech students, qualified in GATE receive Rs 8000 fellowship per month from AICTE. The Ph.D admissions in CSE started in the year 2002 and there are nearly 34 scholars are working for their doctoral degree. The thrust areas of research of the department are Natural Language Processing, Distributed Systems, Grid Computing, Artificial Intelligence, Software Architecture, Data Mining, Wireless Networks and Speech Processing.

PEO'S

PEO1: To Provide quality learning through effective teaching-learning process enabled by free and open learning environment in turn Producing highqualitygraduate.

PEO2: For Prepare students for proper positioning them in the society (academic, industrial, research and entrepreneurial areas in particular) with reference to trans-disciplinary activities, regular professional activities with high degree of innovation, competence, and commitment.

PEO3: To create broad based expertise in the areas of CSE in general and a few (minimum of 4 to 5) focused areas for in-depth study and high quality research such as e-technologies, very large databases, data mining / warehousing, networking, security, high performance computing systems, embedded systems, software engineering methodology, s/w quality testing, multimedia, theoretical computer science aspects and so on.

PEO4: To inculcate the culture of Lifelong learning during the evolution of the student to a full-fledged professional through educating the applicant about the ever increasingneeds of the society, technological trends and ethical values.

PEO5: To set up a sense of efficient administrative / economical practices, to evolve the applicant with the required leadership qualities and managerial skills.

PROGRAMME OUTCOMES:

PO1: An ability to apply knowledge of computing, mathematics, science and engineering fundamentals
appropriate to the discipline

PO2: An ability to analyze a problem, and identify and formulate the computing requirements appropriate to
its solution.

PO3: An ability to design, implement, and evaluate a computer-based system, process, component, or
program to meet desired needs with appropriate consideration for public health and safety, cultural,
societal and environmental considerations.

PO4: An ability to design and conduct experiments, as well as to analyze and interpret data

PO5: An ability to use current techniques, skills, and modern tools necessary for computing practice.

PO6: An ability to analyze the local and global impact of computing on individuals, organizations, and

society.

PO7: Knowledge of contemporary issues.

PO8: An understanding of professional, ethical, legal, security and social issues and responsibilities.

PO9: An ability to function effectively, individually as well as in teams.

PO10: An ability to communicate fluently with a variety of audiences.

PO11: Recognition of the need for and an ability to engage in continuing professional development.

PO12: An understanding of engineering and management principles and applying these as a member/leader in

a team, in managing projects.

I SEMESTER

Course Code	Course Title	Instruction Hours per Week				Course Type	Credits
		Theory	Tutorial	Lab.	Total		
MAT01	Engineering Mathematics – I	3	2		5	Basic	4
CST01	Computer Programming	3	2		5	Basic	4
CET01	Environmental Studies	2	2		4	Basic	3
CET02	Basic Civil Engineering	3			3	Basic	3
MET02	Basic Mechanical Engineering	3			3	Basic	3
ENT01	English	3			3	Basic	3
CSP01	Computer Programming Lab			3	3	Basic	2
ENP01	English Communication Lab			3	3	Basic	2
		17	6	6	29		24

IISEMESTER

Course Code	Course Title	Instruction Hours per Week				Course Type	Credits
		Theory	Tutorial	Lab.	Total		
MAT02	Engineering Mathematics – II	3	2		5	Basic	4
CST02	Data Structures	3	2		5	Basic	4
PHT01	Engineering Physics	3			3	Basic	3
CYT01	Engineering Chemistry	3			3	Basic	3
EET 02	Circuit Theory (Branch Subject)	4			4		4
MET01	Engineering Graphics	2		3	5	Basic	4
CSP02	Data Structures Lab			3	3	Basic	2
MEP01	Workshop Practice			3	3	Basic	2
		18	4	9	31		26

CS 21 **III SEMESTER**

Course No.	Course Title	Instruction hours per week				No. of Credits		
		L	T	P	Total	L+T	P	Total
MAT 03	Engineering Mathematics-III	3	2	-	5	4	-	4
CST 03	Digital Logic Design	2	2	-	4	3	-	3
CST 04	Discrete Mathematical Structures	3	1	-	4	4	-	4
ECT 41	Elements of Electronics and Communication Engineering	2	2	-	4	3	-	3
CST 05	Java and Advanced Data Structures	2	1		3	3		3
MAT 04	Probability and Statistics	3	2		5	4		4
ECP 01	Elements of Electronics and Communications Engineering Laboratory	-	-	3	3	-	2	2
CSP 03	Java and Advanced Data Structures Laboratory	-	-	3	3	-	2	2
	TOTAL	15	10	6	31	21	4	25

L: Lecture P: Practical
T: Tutorials

NOTE: For each Course:
Sectional Marks: Test 1 Test2 Max.40={0.8*max(T1,T2) + 0.2*min(T1,T2)}
End Semester Examination Marks: 60
Total Marks: 100
Lab Internal 40
External 60
Total Marks: 100

CS 22 **IV- SEMESTER**

Course No.	Course Title	Instruction hours per week				No. of Credits		
		L	T	P	Total	L+T	P	Total
CST 06	Computer Organization	3	1	-	4	4	-	4
CST 07	Database Management Systems	2	1	-	3	3	-	3
CST 08	Python Programming Language	2	1	-	3	3	-	3
MAT 05	Computer Oriented Numerical Methods	2	1	-	3	3	-	3
MAT 06	Computer Oriented Optimization Techniques	2	1		3	3		3
MET 41	Simulation and Modeling	2	1		3	3		3
EEP 04	Electrical Engineering Laboratory	-	-	4		-	4	2
CSP 05	Database Management Systems Lab	-	-	4		-	4	2
CSP 06	Simulation Modeling and Python Programming Laboratory	-	-	4		-	4	2
	TOTAL	15	6	6	27	21	4	25

L: Lecture P: Practical
T: Tutorials

NOTE: For each Course:
Sectional Marks: Test 1 Test2 Max.40={0.8*max(T1,T2) + 0.2*min(T1,T2)}
End Semester Examination Marks: 60
Total Marks: 100
Lab Internal 40
External 60
Total Marks: 100

CS 31 **V SEMESTER**

Course No.	Course Title	Instruction hours per week				No. of Credits		
		L	T	P	Total	L+T	P	Total
CST 09	Theory of Computation	3	1		4	4		4
CST 10	Unfired Modeling Language	2			2	2		2
CST 11	Operating Systems	3			3	3		3
CST 12	Computer Networks	3	1	-	4	4	-	4
CST 13	Principles of Programming Languages	2	1	-	3	3	-	3
CST 14	Software Engineering	2	1		3	3		3
CSP 07	CN and PPL Laboratory			4	4		2	2
CSP 08	Operating Systems & UML Laboratory			4	4		2	2
	TOTAL	15	4	8	27	19	4	23

S: Seminars L: Lecture P: Practical
T: Tutorials

NOTE: For each Course:

Sectional Marks: Test 1 Test2 Max.40={0.8*max(T1,T2) + min(T1,T2)}

End Semester Examination Marks: 60

Total Marks: 100

Seminars Internal 100

Lab Internal 40

External 60

Total Marks: 100

CS32 **VI- SEMESTER**

Course No.	Course Title	Instruction hours per week				No. of Credits		
		L	T	P	Total	L+T	P	Total
CST 15	Instructional Open Elective (Mandatory)	3	1		4	4		4
CST 16	Design and Analysis of Algorithms	3	1		4	4		4
CST 17	System Programming	2	1		3	3		3
CST 18	Micro Processor and Interfacing	3	1	-	4	4	-	4
CST 19	Software Project Management	2	1	-	3	3	-	3
CSE 01	Massive Online Open Course (MOOCS) Elective-I	3	1		4	4		4
CSP 10	Microprocessors and Interfacing Laboratory			4	4		2	2
CSP 11	Algorithms and System Programming Laboratory			4	4		2	2
CST 12	Soft Skills Laboratory			2	2		1	1
	TOTAL	16	6	10	32	22	5	27

L: Lecture P: Practical
T: Tutorials

NOTE: For each Course:
Sectional Marks: Test 1 Test2 Max.40={0.8*max(T1,T2) + 0.2*min(T1,T2)}
End Semester Examination Marks: 60
Total Marks: 100
Lab Internal 40
External 60
Total Marks: 100

CS 41 **VII- SEMESTER**

Course No.	Course Title	Instruction hours per week				No. of Credits		
		L	T	P	Total	L+T	P	Total
CSE 20	Cyber Law and Ethics	2			2	2		2
CST 21	Artificial Intelligence	2	1		3	3		3
CST 22	Compiler Construction	3	1		4	4		4
CSE 02	Elective –II Cyber Security	3	1	-	4	4	-	4
CSE 03	Elective-III Data Analytics	3	1	-	4	4	-	4
HUT 10	Managerial Accountancy		2		2	2		2
CSP 13	Core Laboratory			4	4		2	2
CSP 14	Elective -I Laboratory			4	4		2	2
CSP 15	Project Work-I			4	4		2	2
CSP 16	Comprehensive Viva-Voice -I						1	1
	TOTAL	15	4	12	31	19	7	26

J:Project Work L: Lecture T: Tutorials P: Practical

NOTE: For each Course:

Sectional Marks: Test 1 Test2 Max.40={0.8*max(T1,T2) + 0.2min(T1,T2)}

End Semester Examination Marks: 60

Total Marks: 100

Interim Project internal 40 External 60 100

Seminar Internal 100

Lab Internal 40

External 60

Total Marks: 100

CS 42 **VIII -SEMESTER**

Course No.	Course Title	Instruction hours per week				No. of Credits		
		L	T	P	Total	L+T	P	Total
CST 24	Elective-IV	3	1		4	4		4
MET 42	Industrial Management	2	1		3	3		3
HUT 02	Managerial economics	2			2			2
CSE17	Elective-II Lab					2	4	2
CSP 18	Project Work-II			8	8		8	4
CSP 19	Seminar-I			2	2		2	1
CSP 20	Comprehensive Viva-Voice -2			2	2		2	2
CSP 21	Internship/Mini Project Viva-Voice Exam						2	2
	TOTAL	7	2	12	19	9	16	20

J: Project Work L: Lecture T: Tutorials P: Practical

NOTE: For each Course:

Sectional Marks: Test 1 Test2 Max.40={0.8*max(T1,T2) + 0.2*min(T1,T2)}

End Semester Examination Marks: 60

Total Marks: 100

Lab Internal 40

External 60

Total Marks: 100

Project work internal 40 External 60 100

MAT01 Engineering Mathematics – I

Instruction Hours / Week : 5 **Credits: 4**

Common to all branches

Course Objectives:

1. The emphasis is primarily on the development of analytical techniques.
2. To make students familiar with Differential Equations and its solutions.
3. To provide the basic knowledge in transformations and in particular Laplace transforms
4. Expansions of functions as a power series
5. Roll's and Mean value theorems and maxima, minima
6. Curve tracing and Evaluation of Multiple Integrals

Syllabus

Unit – 1

Differential Equations: Linear differential equations of second and higher order with constant coefficients-particularintegrals-homogeneous differential equations with variable coefficients-method of parameters-simulation equations.

Unit – 2

Laplace Transforms I: Laplace transforms of standard functions-inverse transforms-transforms of derivatives and integrals-derivatives of transforms-integrals of transforms.

Unit – 3

Laplace Transforms II: Transforms of periodic functions-convolution theorem-applications to solution of ordinary differential equations.

Unit – 4

Calculus: Roll's and Mean value theorems - Taylor's and Maclaurins's series-maxima and minima for functions of two variables - Infinite series - Convergence Tests series of positive terms - comparison, Ratio tests - Alternating series - Leibnitz's rule - Absolute and conditional convergence.

Unit – 5

Multiple Integrals: Curve tracing (both Cartesian and polar coordinate) - Evaluations of double and Triple integrals-change of order of integrations-change of variables of integrations-simple applications to areas and volumes.

Text Books:

1. B S Grewal, Higher Engineering Mathematics, 40th Edition, Khanna Publications, 2007.
2. M K Venkataraman, Engineering Mathematics, National Publishing Company, Chennai.
3. B V Ramana, Higher Engineering Mathematics, 6th Reprint, Tata McGraw-Hill, 2008.
4. Bali and Iyengar, Engineering Mathematics, 6th Edition, Laxmi Publications, 2006.

Course Outcomes:

1. 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 n^{th} order ordinary differential equation using the Laplace transform.
6. Expand functions as power series using Maclaurin's and Talor's series
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.
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.
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.

Mapping of Course Outcomes with Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**1**											
CO2		**2**			**2**							
CO3			**3**	**1**								
CO4			**1**									
CO5					**3**	**2**						

CST01 Computer Programming

Instruction Hours / Week : 5 **Credits: 4**

Common to all branches

Prerequisites:

1. There are no prerequisites for this course, except that anyone who wants to learn C as well as should have analytical skills and logical reasoning.

Course Objectives:

1. This course starts from the basics of program development.
2. To understand the various steps in Program development
3. It covers various concepts of C and C++ programming languages
4. To learn how to write modular and readable C Programs
5. To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
6. To understand the notations used to analyze the Performance of algorithms.
7. It introduces searching and sorting algorithms
8. To understand and analyze various searching and sorting algorithms

Syllabus

UNIT – I

Introduction to Programming– Problem Solving Steps, SDLC, Algorithms, and flow charts.
Common features of C and C++ Programming Languages – Identifiers, Variables, Constants,data types, Operators and Expressions, Input / Output operations.Statements- Decision Making, Branching and Looping, continue, go to and break.Precedence and Associatively, Expression Evaluation, Type conversions.C and C++ Simple Programming examples

UNIT – II

Arrays and Strings – Concepts, arrays, one and two and multidimensional arrays.Strings Handling: String Input / Output functions, arrays of strings, string manipulation functions, data conversion, C and C++ Simple Programming examples

Designing Structured Programs- Functions- basics, functions, Scope, Storage classes- auto, register, static, extern, scope rules, type qualifiers, recursion, Preprocessor directives.

Derived types – Structures – Declaration, definition and initialization of Structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types.C and C++ Simple Programming examples

UNIT – III

Pointers – Introduction, Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, pointers to void, pointers to functions, command –line arguments. C and C++ Simple Programming examples

Data File Handling: Input and Output– Concept of a file, streams, standard input / output Functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (Eq.error handling), C and C++ Simple Programming examples.

Dynamic Memory Allocation: Allocating a Block and Multiple Blocks, releasing the used space and altering memory size. C and C++ Simple Programming examples

UNIT – IV

Basics of Object Oriented Programming (OOP) and **C++:** BenefitsofOOP, datatypes, declarations, expressions and operatorprecedence,scope ofvariables

Introductionto OOP and Concepts: Abstraction**,** Data hiding, Encapsulation Classesand objects, Constructors&Destructors,Operator overloading&type conversions.

Polymorphism: Pointers, virtualfunctions andpolymorphism- pointers to objects,thispointer, pointers to derived classes, virtual and purevirtualfunctions,C++ Simple Programming examples

UNIT – V

Inheritance: Derived classes, syntax of derived classes, making privatemembers inheritable, single, multilevel,multiple, hierarchical, hybridinheritance.

Templates, Exception handling,consoleI/Oand FileI/O:classtemplates,Function tempplates, member functiontemplates, exception handling, managing console I/Ooperations, working with files. Programming guide lines and Simple C++ Programming examples

TEXT BOOKS:

1. Scheldt H, C: The Complete Reference, 4th Edition, Tata McGraw-Hill, 2002.
2. Balagurusamy E, Programming in ANSI C, 4th Edition, Tata McGraw-Hill, 2008
3. Robert Lefore, Object Oriented Programming in C++, 4th edition, PEARSON Education
4. Scheldt H , C++ : The Complete Reference, Tata McGraw-Hill

REFERENCES:

1. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
2. Programming in C – Stephen G. Kochan, III Edition, PearsonEductaion.
3. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
4. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J.Augenstein, Pearson Education / PHI
5. C Programming & Data Structures, P. Dey, M Ghosh R Thereja,Oxford University Press
6. C & Data structures – E V Prasad and N B Venkateswarlu, S.Chand& Co
7. Kernighan & Ritchie, The C programming language (2nd edition). Prentice Hall of India, 1988.
8. Coohoon and Davidson, C++ Program Design: An introductionto Programming and Object-Oriented Design. Tata McGraw Hill3rd edition. 2003.

9. G. Dromey, How to Solve it by Computer, Prentice-Hall Inc.,Upper Saddle River, NJ, 1982.Yashwant Kanetkar, Let's C, Allied Publishers, 1998.
10. Programming in C, PradipDey, ManasGhosh, Second Edition, OXFORD

Course Outcomes:

1. Able to design the flowchart and algorithm for real world problems
2. Able to learn and understand new programming languages
3. Able to construct modular and readable programs
4. Able to write C and C++ programs for real world problems using simple and compound data types
5. Adapt programming experience and language knowledge to other programming language contexts
6. Good programming style, standards and practices during program development

Mapping of Course Outcomes with Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1									
CO2	1			2	2							
CO3			2	3		1						
CO4		1		2								
CO5			2	2	1							

CET01 Environmental Studies

Instruction Hours / Week :4 **Credits: 3**

Common to all branches

Course Educational Objective (CEOs):

1. To Impart basic knowledge about the environment and its allied problems
2. To apply knowledge in Economic development without destroying the environment
3. To have knowledge on renewable energy and non renewable energy sources
4. To know about the bio diversity and its concepts

Syllabus

Unit I Environmental Studies and Natural Resources

Definition, Scope and importance ofEnvironment, Environmental studies, Need for public awareness

Components of Environment- Atmosphere, Hydrosphere, Lithosphere.

Renewable and **Non Renewable Resources and associated problems**

Water resources: Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

Forest resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

Land resources: Land as a resource, land degradation, Man induced landslides, soil erosionand desertification.

Mineral resources: Use and overexploitation, Environmental effects of extracting and using mineral resources, case studies.

Food resources: World food problems, changes caused agriculture and overgrazing, effectsof modern agriculture, fertilizer – pesticide problems, water logging, salinity, Case studies.

Energy resources: Growing energy needs, renewable and non renewable energy sources, useof alternate energy sources. Case studies.

Role of an individual in conservation of natural resources.

Unit II Ecosystem and Biodiversity : Ecosystem

- Concept of an ecosystem.

Structure and functions of an ecosystem.
Producers, consumers and decomposers.
Energy flow in the ecosystem.
Ecological succession.
Food chains, food webs and ecological pyramids.
Introduction, types, characteristic features, structure and function of the following ecosystem.
(a) Forest ecosystem. (b) Grassland ecosystem
(c)Desert ecosystem. (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans,estuaries)

Biodiversity and its conservation:

Definition, genetic species and ecosystem diversity.
Biogeographically classification of India.
Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
Biodiversity at global, National and local levels.
India as a mega-diversity nation.
Hot-spots of biodiversity.
Threats to biodiversity: habitat loss, poaching of wildlife, man – wildlife conflicts.

Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

Unit III Environmental pollution and Global Effects.

Definition, Causes, Effects, and control measures of (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclearhazards
Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: Floods, earthquakes, cyclone, landslides, Tsunami.
Climate change-Global warming, Acid rain, Ozone depletion,.

Unit IV Environment Issues and Management

Environment and Human health – Epidemic diseases, HIV/AIDS, Aviation Flue, Water Borne Diseases.
Environmental Impact Assessment, Sustainable Development, Clean Production and Clean Development Mechanisms
Environment Legislation: Environmental Protection Act, Water Act, Air Act, Wild Life Protection Act, Forest Conservation Act, Public Liability & Insurance Act, Issues involved in Enforcement of Environmental legislation.

Unit V Social Issues and the Environment

Population growth, Population Explosion, Population Control, Women and Child welfare.
Urbanization, Industrialization, Development projects, Resettlement and Rehabilitation of people – Problems concerned, Case studies.
Consumerism and Waste Products Conservation, Public Awareness, Water Conservation, Rain water harvesting, watershed management, Wasteland reclamation, Human Rights, Value education, Environmental ethics- Issues and possible solution.

Role of information Technology in Environment and Human Health.

Text books:

1. AnubhaKaushik& C P Kaushik, Environmental studies, New age International Publishers, 2008
2. Benny Joseph, Environmental studies, Tata McGraw-Hill Publishers, 2005

3. M Chandra Sekhar, Environmental Science, Hi-Tech Publishers, 2004.
4. Keerthinarayana and Daniel Yesudian, Principles of Environmental Sciences and Engineering , Hi-Tech Publishers, 2005
5. AmalK.Datta, Introduction to Environmental Science and Engineering, Oxford & IBH Publishing Co.Pvt.Ltd, 2000
6. SanthoshkumarGarg,RajeshawriGarg and RajniGarg, Ecological and Environmental studies, Khanna publishers, 2006

REFERENCE

1. Gilbert M, Introduction to Environmental Engineering and Science, Masters Publication by Prentice –Hall of India Private Ltd., 1991
2. William P Cunningham and Mary Ann Cunningham, Principles of Environmental Science, Tata McGraw Hill Publishing Co.Ltd, 2002

Course Outcomes:

On successful completion of this course the students will be able to

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.

Mapping of Course Outcomes with Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1					2	2	1				2
CO2	1					1	2	1				2
CO3						2	2	3				
CO4			1			2		1				1

CET02 Basic Civil Engineering

Instruction Hours / Week : 3 **Credits: 3**

Common to EEE, ECE, CSE branches

Course Objectives:

1. To provide basic knowledge on different elements of civil engineering
2. To gain knowledge in various materials used for construction.
3. To become skilled at various aspects of surveying
4. To be familiar with the particulars of environmental concepts

Syllabus

UNIT I : CIVIL ENGINEERING MATERIALS

Introduction to materials – Timber, Cement, Steel, Bricks, Rocks & Stones, Tiles, Ceramics, glass, Paints, Varnishes and Distempers

Mixes: Mortars, Concrete

UNIT II: ELEMENTS OF BUILDING CONSTRUCTION

Types of buildings ,Functional requirements of a building, principles of planning of a building, brick masonry, floors and floorings, Doors and windows, stairs, roofs, types of foundation, failure of foundations and remedial measures.

UNIT III: SURVEYING

Objective of Surveying, Types of surveying, classification of surveying, principles of surveying, measurement of distance, measurement of distance, measurement of angles, leveling, determination of Areas and volumes

Basic principles and applications of remote sensing, Global positioning systems (GPS), Geographical Information System (GIS)

UNIT IV: TRANSPORTATION ENGINEERING

Roads: Introduction, Road transport characteristics, Benefit of a good system of roads, classification of roads.

Bridges: Necessity of bridges, site investigation, components of a bridge, classification of bridges.

UNIT V: WATER RESOURCES & ENVIRONMENTAL ENGINNEING

Water resources- quality and quantity, water quality standards for drinking and construction-Irrigation and types – crop seasons-Types of crops, reservoirs and types-rain water harvesting

TEXT BOOKS:

1. ELEMENTS OF CIVIL ENGINEERING, Edition: 3rd Edition : 2015, AnuragA.Kandya
2. S.S. Bhavikatti , BASIC CIVIL ENGINEERING, Vikas Publishing House Pvt Limited, 2004
3. Palanichamy M S, Basic Civil Engineering, 3rd Edition, Tata McGraw-Hill, 2000

REFERENCE BOOK:

1. Gopi S, Basic Civil Engineering, Pearson Education, 2010

Course Outcomes:

On completion of the course, the students will be able to:

1. To find the suitability of various building materials at a particular location in the building construction.
2. Take accurate measurements, field booking, plotting and adjustment of errors can be understood

3. Analyzethestatusofwaterqualitystandardsfordrinkingandconstruction

4. Classify the roads and bridges

MappingofCouseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2		1					3	2
CO2	3	3		1			2		3			3
CO3	2	1		2								
CO4	1		2			2						

MET02 Basic Mechanical Engineering

Instruction Hours / Week :3 **Credits: 3**

Common to EEE, ECE, C SE branches

Course Objectives:

1. To give overall picture of mechanical engineering from the point of view of basic concepts.
2. To learn about basic laws of thermodynamics.
3. To give insight into IC engines, steam engines, and steam turbines, gas turbines.
4. To make known the basic manufacturing processes and machine tools.
5. To learn about power transmission devices.

Syllabus

UNIT – I

Introduction to Thermodynamics – Concept of a system – Types of Systems, Thermodynamic Equilibrium – Properties, State, Process and Cycle, Zeroth Law, Energy Interactions – Heat and work, Types of work.

First and Second Laws of Thermodynamics : First law, Cycle and process, Specific heats, Heat interactions in a closed system for various processes, Limitations of First law, Concept of Heat Engine (H.E.) and reversed heat engine (Heat pump and refrigerator) , Efficiency/COP, Second Law: Kelvin – Plank and Clausius Statements , Carnot Cycle, Carnot Efficiency, Property of Entropy – T- S and P – V diagrams

UNIT – II

Thermal Power Plant: Thermal power plant layout – Four circuits – Rankine cycle, Boilers: Fire tube Vs Water Tube; BobCock and Wilcox, Cochran Boilers, Steam Turbines, Impulse Vs. Reaction Turbines, Compounding of Turbines.

UNIT – III

Internal Combustion Engines (IC): I.C. 2 – Stroke and 4 – Stroke engines – S.I. engines and C.I. engines – Differences Heat transfer – Modes – Thermal resistance concept, Conduction, Composite walls and Cylinders. Combined Conduction and Convection – Overall Heat transfer Coefficient, Simple Numerical Problems in Heat transfer.

UNIT – IV

Manufacturing Processes : Engineering Materials ; Classification , Properties of materials, Metal Casting, Moulding, Patterns, Hot working and Cold working , Extrusion, Forging, Rolling and Drawing.

Machine Tools and Machining Processes – Lathe Machines and Lathe operations, Milling machines, Types – Milling operations , Shaper, Planer, Drilling and Grinding machines.
Welding – Gas welding, Arc Welding, Soldering and Brazing

UNIT – V

Power Transmission – Transmission of Mechanical Power, Belt drives, Simple Numerical Problems, Gear Drives – Simple Numerical Problems

Basics of Automotive vehicle – Brakes – Types - Clutch and Differential.

Text Books:

1. Mathur, M.L., Mehta F.S. and Tiwari R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2011.
2. Roy K.P. and HazraChowdary, S.K., Elements of Mechanical Engineering, Media Promoters and Publishers Pvt., Ltd, 2002.
3. Rudramoorthy R., Thermal Engineering, Tata McGrawHill Book Company, New Delhi, 2003.
4. HazraChowdary, S.K., and Bose, Workshop Technology , Vol. I and II, Media Promoters and Publishers Pvt. Ltd., 2002.

Course Outcomes: At the end of the course, the student will be able to

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.

MappingofCouseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3		2		1		2	1	
CO2	3	3			2			3		2		3
CO3	3	3		2	2	1			1		3	
CO4	3	3		3		2		2		3		
CO5	3	2			3		3		3		1	

ENT01 English

Instruction Hours / Week : 3 **Credits: 3**

Common to all branches

Course Objectives:

1. To introduce students elements of grammar and composition of English language.
2. To familiarize students with literary texts such as short stories and prose passages.
3. To maintain linguistic competence through training in vocabulary, sentence structures and pronunciation.
4. To develop communication skills by cultivating the habit of reading comprehension passages.
5. To train the students to develop the language skills like listening, speaking, reading and writing.
6. To initiate them into use of self-instructed learner friendly modes of language learing through competence.

Syllabus

Unit-I Effective Communication: Role and Importance of Communication, Features of Human Communication, Process of Communication, Interpersonal Communication, Barriers, Types- Verbal, Non-Verbal.

Unit-II Grammar: Articles, prepositions, tenses, reported speech, idioms and phrases

Unit-III Listening Skills: Process of Listening, Tips for Effective Listening, Speaking Skills: Basics of Spoken English, English Sounds, Rhythm and Intonation
Telephonic Skills, Group Communication
Reading Skills: Developing Reading Skills, Reading Strategies, Reading Comprehension,
Writing Skills: Paragraph Writing, Essay Writing, E-writing, Job applications, , Reports.
Resume and Letter Writing.

Unit-IV
Soft Skills: Tem Work Skills, Interview Skills, Problem- Solving Skills Adoptability Skills, Presentation Skills and Group Discussions.

Unit- V Stories from Delight and Wisdom (An Anthology of Short Stories)

1. The Gift of Magi By O. Henry
2. The Diamond Necklace by Guy De Maupassant
3. My Brother, My Brother by Norah Burke
4. The Open Window by Saki
5. The Child by Premchand

Text Books:

1. Oxford guide to Effective writing and Speaking by John Seely, Oxford University Press, 2013, ISBN- 978-0-19-871393-7
2. Delight and Wisdom published by Orient Blackswan, 2009, ISBN: 978-81-250-3716-3

Reference Books:

1. David Green, Structure and Composition in English, Macmillan Publishers India Limted.
2. Communicative English by E. Suresh Kumar, P. Sreehari, Orient BalckSwan, 2009.
ISBN: 13:9788125032502
3. English and Soft Skills by S P Dhanavelpublished byOrient Blackswan, 2013. ISBN 9788125039808
4. Personality Development and Soft Skills by Barun K. Mitrapublished byOxford University Press. 2012. ISBN : 13:97280198066217

Course Outcomes:

1. Student will be able to get a thorough knowledge of various topics of grammar of English language.
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.

MappingofCouseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2									
CO2	2		2	2								
CO3		1		2	2							
CO4			2	2	3							
CO5		1	1	2								

CSP01 Computer Programming Lab

Instruction Hours / Week : 3 **Credits: 2**

Common to all branches

Course Objectives:

1. To work with the compound data types
2. To explore dynamic memory allocation concepts
3. Able to design the flowchart and algorithm for real world problems
4. Able to write C and C++ programs for real world problems using simple and compound data types
5. Employee good programming style, standards and practices during program development

Syllabus

1. **C and C++ Programming Languages shall be used for Implementation of the following Programs.**
2. **The following List is not exhaustive, The instructor changes the problems and number of programs for continuous evaluation Teaching Learning Process**

Week-1

1) Write a C program to make the following exchange between the variables a-> b -> c->d - > a
2) Write a C program to carry out the arithmetic operations addition, subtraction, multiplication, and division between two variables
3) Write a C program for printing prime numbers between 1 and n.

Week-2

1) Write a C program to construct a multiplication table for a given number.
2) Write a program to reverse the digit of a given integer.
3) Write a C program to find the sum of individual digits of a positive integer.
4) Write a C program to calculate the factorial of a given number

Week-3

1) Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
2) Write a program to calculate tax, given the following conditions:
   a) If income is less than 1, 50,000 then no tax.
   b) If taxable income is in the range 1,50,001 – 300,000 then charge 10% tax
   c) If taxable income is in the range 3,00,001 – 500,000 then charge 20% tax
   d) If taxable income is above 5,00,001 then charge 30% tax

Week-4

1) Write a program to print the calendar for a month given the first Week- day of the month.

Input the first day of the month (Sun=0,Mon=1,Tue=2,Wed=3,.....) :: 3
Total number of days in the month : 31
Expected output

Sun	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*
-	-	-	*1*	*2*	*3*	*4*
5	*6*	*7*	*8*	*9*	*10*	*11*
12	*13*	*14*	*15*	*16*	*17*	*18*
19	*20*	*21*	*22*	*23*	*24*	*25*
25	*26*	*27*	*28*	*29*	*30*	*31*

2) Write a C program to find the roots of a quadratic equation

Week-5

1) Write a program to print the Pascal triangle for a given number
2) Write a C program to find the GCD (greatest common divisor) of two given integers
3) Write a C program to construct a pyramid of numbers.
4) Write C code to define a function cash_dispense, which takes an amount as its input, and returns the number of 1000, 500, 100, 50, 20, 10, 5, 2, 1 rupee denomination that make up the given amount

Week-6

1) Write C code to reverse the contents of the array. For example, [1,2,3,4,5] should become [5,4,3,2,1]
2) Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices
   ii) Multiplication of Two Matrices
3) Write a program that will search and find out the position where the given key element exist in a user chosen array and print it as output.

Week-7

1) Write C code to compute the frequency table of survey responses given by 20 users. The survey responses range from 1 to 5 and are stored in an array. For example, 10 responses are stored in the array [1,1,5,2,3,3,5,5,2,2]. The frequency table will be as shown below:
   a. 1 = 2
   b. 2 = 3
   c. 3 = 2
   d. 4 = 0
   e. 5 = 3
2) Write a program to define a function to sort an array of integers in ascending order by using exchange sort.

Week-8

1) Write a C program to check whether a given string is a palindrome or not, without using any built-in functions.
2) Write a C program to determine if the given string is a palindrome or not by using string functions.
3) Write a function that accepts a string and delete the first character.
4) Write a function that accepts a string and delete all the leading spaces.

Week-9 Write a program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given string.

Week-10

1) Write a C program to define a union and structure both having exactly the same numbers using the sizeof operators print the sizeof structure variables as well as union variable
2) Declare a structure *time* that has three fields *hr, min, secs.* Create two variables,*start_time*and*end_time.* Input there values from the user. Then while *start_time* is not equal to *end_time* display GOOD DAY on screen.

Week-11

1) Write a program to read in an array of names and to sort them in alphabetical order. Use sort function that receives pointers to the functions strcmp, and swap, sort in turn should call these functions via the pointers.
2) Write a program to read and display values of an integer array. Allocate space dynamically for the array using the *malloc()*.
3) Write a program to calculate area of a triangle using function that has the input parameters as pointers as sides of the triangle.

Week-12 1) Two text files are given with the names text1 and text2. These files have several lines of text. Write a program to merge (first line of text1 followed

by first line of text2 and so on until both the files reach the end of the file) the lines of text1 and text2 and write the merged text to a new file text3.

2) Write a program to split a given text file into n parts. Name each part as the name of the original file followed by .part<**n>** where n is the sequence number of the part file.

Reference Books:

1. Computer Science, A Structured Programming Approach Using C by Behrouz A. Forouzan& Richard F. Gilberg, Third Edition, Cengage Learning
2. C Programming A Problem-Solving Approach, Behrouz A. Forouzan& E.V. Prasad, F. Gilberg, Third Edition, Cengage Learning
3. Programming with C RemaTheraja, Oxford
4. "C Test Your Skills", Kamthane, Pearson Education
5. Programming in C: A Practical Approach, Ajay Mittal, Pearson
6. Problem solving with C, M.T.Somasekhara, PHI
7. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press
8. Programming withc, Byron S Gottfried, Jitender Kumar Chhabra, TMH, 2011

Course Outcomes:

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.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3		2		1		2	1	
CO2	3	3			2			3		2		3
CO3	3	3		2	2	1			1		3	
CO4	3	3		3		2		2		3		
CO5	3	2			3		3		3		1	

ENP01 English Communication Lab

Instruction Hours / Week : 3 **Credits: 2**

Common to all branches

Course Objectives:

1. To enable students to use language software.
2. To make them aware of western accents.

Syllabus

At least twenty exercises covering the topics: Stress, Introduction, Accent, Intonation, English vsHinglish and Important Skills using Computer-Aided Packages.

Text Book:

1. Barry Tomalin and Suhashini Thomas, International English for Call Centres, McMillan Publishers, India Limited, 2009.

Course Outcomes:

1. Students gain felicity in using language software.
2. They are exposed to different accents of the language.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2									
CO2	2		2	2								

SEMESTER-II

MAT02 Engineering Mathematics – II

Instruction Hours / Week : 5 **Credits: 4**

Common to all branches

Course Objectives:

1. Rank of a matrix, Eigen values, Eigen vectors- Cayley Hamilton theorem- Quadratic forms-diagonalization
2. Gradient of a scalar, Divergence, Curl of a vector and related properties- line, surface, volume integrals Green's, Stokes' and Gauss divergence theorems and its applications.
3. Fourier Series- Harmonic analysis
4. Gamma and Beta Functions
5. Bessel function and Legender Polynomials

Syllabus

Unit – 1

Matrices: rank of a matrix-solution of system of linear equations-eigenvalues,vectors-cayley-hamilton theorem-quadratic forms-diagonalization.

Unit – 2

Vector Calculus: Gradient, Divergence, Curl of a vector and related properties-line, surface, volume integrals- Green's, Stokes's and Gauss Divergence theorems and its applications.

Unit – 3

Fourier Series: Fourier series-even and odd functions, periodic functions-half range sine and cosine series-harmonic analysis.

Unit – 4

Special Functions I: Gamma and Beta functions-series solutions of differential equations-ordinary points.

Unit – 5

Special Functions II: Bessel function-recurrence formulae-generating function for $J_n(X)$-Lengender

polynomials-recurrence formulae-generating function for $P_n(X)$ - Rodrigue's formula - orthogonality of Lengender polynomials.

Text Books:

1. B S Grewal, Higher Engineering Mathematics, 40th Edition, Khanna Publications, 2007.
2. M K Venkataraman, Engineering Mathematics, National Publishing Company, Chennai.
3. B V Ramana, Higher Engineering Mathematics, 6th Reprint, Tata McGraw-Hill, 2008.
4. Bali and Iyengar, Engineering Mathematics, 6th Edition, Laxmi Publications, 2006.

Course Outcomes:

1. 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.
5. To use Green's theorem to evaluate line integrals along simple closed contours on the plane
6. To use Stokes' theorem to give a physical interpretation of the curl of a vector field
7. To use the divergence theorem to give a physical interpretation of the divergence of a vector field.
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.
9. Evaluation of certain improper integrals is made simple with introduction of Gamma and Beta functions
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.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	3		1			2		3	
CO2	2	3	3		3		1					2
CO3		1				2		2				
CO4	1	3		3				1				
CO5	3		3		2			2				

CST02 Data Structures

Instruction Hours / Week : 5 **Credits: 4**

Common to all branches and with effect from 2016-17

Course Objectives:

1. To develop skills to design and analyze linear and nonlinear data structures.
2. Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.
3. Develop recursive algorithms as they apply to trees and graphs.
4. To get acquaintance with frequently used data structures in Software Engineering and Programming practices.

5. To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
6. To develop a base for advanced computer science study.

Syllabus

UNIT I

Definitions of Data structures, Storage Structures and File Structures.Primitive and Non-primitive Data Structures, Linear and Nonlinear Data Structures.

Performance Analysis, Asymptotic Notation and Performance Measurement.

Linear Lists - ADT, Array Representation, Linked Representation and applications.

UNIT II

Stacks: Definition, The Abstract Data Type, Array Representation, Linked Representation. Queues: Definition, The Abstract Data Type, Array Representation, Linked Representation, Circular Queues, Applications. Linked Lists: Single Linked Lists – Insertion and Deletion, Double Linked Lists – Insertion and Deletion.

Skip List and Hashing: Dictionaries, the ADT of Skip List, Linear List Representation, Hash Table Representation.

UNIT III

Binary Trees - Definition and Properties, ADT, Array Representation, Linked Representation, and Applications.Heap- Definition and Applications.

Binary Search Trees - Definition, ADT, Implementation and Applications.

Introduction to Balanced Search Trees - AVL Trees, Red-Black Trees, and Splay Trees.

UNIT IV

Graphs - Definition and Properties, Modeling Problems as Graphs, ADT, Representations, Breadth First Search and Depth First Search.Priority Queues: Definition and Applications, Single and Double Ended Priority Queues, Linear Lists, Heaps, Leftist Trees, Binomial Heaps, Fibonacci Heaps, Pairing Heaps

Introduction to Algorithms for Solving Problems: Minimum Spanning Tree, Single Source Shortest Paths, All-Pairs Shortest Paths, and Maximum Flow.

UNIT V

Efficient Binary Search Trees: Optimal Binary Search Trees, AVL Trees, Red – Black Trees, Splay Trees. Multiway Search Trees: m – way Search Trees, B – Trees, B+ - Trees

External Searching -Concepts of Simple Indexing, Multilevel Indexing, B- Trees, B+ Trees, Static Hashing, Collision Resolution Techniques, Packing Density, Bucket Size and Extendible Hashing.

Text Books:

1. Sahni S, Data Structures, Algorithms and Applications in C++, 2nd Edition, Universities Press, 2005.
2. Malik D S, Data Structures using C++, Cengage Learning, 2003.
3. Fundamentals of Data Structures in C++ by Ellis Horowitz, SartajSahni, Dinesh Mehta, Universities Press, Second Edition.

REFERENCES:

1. Data Structures and Algorithms Using C++ by AnandaRaoAkepogu and RadhikaRajuPalagiri
2. Classic Data Structure by D. Samanta, Eastern Economy Edition.
3. Data Structures and Algorithms Made Easy by NarasimhaKarumanchi, Second Edition, Written in C/C++, CareerMonk Publications, Hyderabad
4. ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson
5. Data Structures using C++, D.S.Malik, 2nd Edition, Cengage Learning
6. Data Structures through C++, YashavantP.Kanetkar, BPB Publication
7. DataStructuresusingCandC++,YedidyahLangsam.MosheJ.AugensteinAaron

M.Tenenbaum, 2nd Edition,PHI
8. Data Structures using C & C++, Rajesh K.Shukla, Wiley-India
9. Tremblay J P and Sorenson P G, Introduction to Data Structures with Applications, 2nd Edition, McGraw-Hill, 1984.
10. Cormen T H, Leiserson C E, Stein C, and Rivest R L, Introduction to Algorithms, 2nd Edition, Prentice Hall of India, 2007.
11. Folk M J, Riccardi G, and Zoellick B, File Structures-An Object-Oriented Approach with C++, Pearson
12. T.H.Cormen, C.E.Leiserson, R.L.Rivest, C. Stein, Introduction to Algorithms, 2nd edition, Prentice-Hall India, 2001
13. J. Kleinberg and E. Tardos, Algorithm Design, Pearson International Edition, 2005.
14. Data Structures Using C and C++ YddishLangsam, Moshe J. Augenstein and Aaron M. Tanenbaum, Prentice Hall Of India (2nd Edition) (Chapters 1 to 8)

Course Outcomes:
After completion of the course the student will have:

1. A knowledge of various Methods and Notations for comparing the performance of various Data Structures.
2. A knowledge of developmentof linear data structures like stacks, Queues and their operations, Implementation using Arrays and Linked Lists.
3. A knowledge of propertiesof Binary Search Trees and balanced binary search trees.
4. A knowledge of properties of Splay Tress ,Red Black Trees ,AVL Tress and their implementation.
5. A knowledge of efficient external searching techniques using Indexing, Hashing.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2		1	2	1						
CO2	1	2	1		1	1						
CO3		1	2	2								
CO4		1	2	1	2							
CO5			2	2	1							

PHT01 Engineering Physics

Instruction Hours / Week : 3 **Credits: 3**

Common to all branches and with effect from 2016-17

Course Objectives:

1. To make students aware of basic crystallographic geometry, defect studies and estimation of crystal structure by diffraction techniques.
2. To provide students with sound knowledge of basic principles of quantum Mechanics and its applications in problem solving.
3. To understand the concept of electrical conductivity by classical and quantum free electron theories and distinguishing materials based on band theory of solids.
4. Basic principles of laser optics and applications and ultrasonics.
5. Quantum confinement and size dependent properties of nanomaterials, their synthesis and applications.

Syllabus

UNIT-I

Crystallography : Unit Cell – Bravais Lattice – Crystal systems – Crystal packing – Close Packed Structures – NaCl, ZnS and Diamond – Miller Indices – Bragg`s Law –Bragg`s Spectrometer and Crystal Structure determination – Defects in crystal Structure – Point Defects and Line Defects .

UNIT – II

Quantum Mechanics : Wave – Particle duality – de Broglie Concept of Matter Waves – Properties of Matter Waves – Davison and Germer Experiment – G.P.Thomson Experiment – Heisenberg's Uncertainty Principle – Schrödinger's Time Independent and Time Dependent Wave equation – Significance of Wave Function – Electron in an Infinite Square Potential Well – Probability Densities and Energy Levels.

UNIT – III

Band Theory of Solids : Classical Free Electron Theory of Metals – Success and Failures – Quantum Free Electron Theory – Fermi Factor – Electron in Periodic Potential – Bloch Theorem – Kronig – Penney Model – Distinction between Metals , Insulators and Semiconductors – Intrinsic and Extrinsic Semiconductors – Hall Effect.

UNIT – IV

Lasers : Introduction – Spontaneous and Stimulated emissions – Population Inversion – Types of Lasers – Ruby Laser – He-Ne Laser – Semiconductor Laser – Applications of Lasers.

Ultrasonics : Introduction – Production of Ultrasonic Waves by Magnetostriction and Piezoelectric methods – Detection and Applications of Ultrasonic Waves.

UNIT – V

NanoPhysics and Nanotechnology : Introduction to Nanomaterials –Properties: Optical Properties – Quantum Confinement – Electrical properties. Synthesis of Nanomaterials: Ball milling, Arc deposition method – Chemical Vapour Deposition-Pulsed laser deposition. Characteristics of C^{60} (Zero dimensional), Carbon Nanotubes (One Dimensional) and Graphene(Two Dimensional). Applications of Nanomaterials.

Text Books:

1. R.K.Gaur and S.L.Gupta ``Engineering Physics" Sultan and Chand Pub., New Delhi
2. S.P.BasavaRaju `` A Detailed Text Book of Engineering Physics" Sole Distributers, Subhash Stores Book Corner, Bangalore
3. HitendraK.Malik and A.K.Singh ``Engineering Physics" Tata MCGraw Hill Education PVt.Ltd., New Delhi
4. G.Senthil Kumar, `` Engineering Physics'' VRH Publishers Pvt. Ltd, Hyderabad
5. M.S.RamachandraRao and Shubra Singh, ``Nanoscience and Nanotechnology`` Wiley IndiaPvt.Ltd, New Delhi

Refrence Books

6. John Allison, ``Electronic Engineering Materials and Devices" Tata McGraw Hill Publications.
7. B.L Theraja, "Modern physics", S.Chand& Company.
8. V. Raghavan "Material Science", Tata McGraw Hill Publications.

Course Outcomes:

1. Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.

2. Ability to understand the crystal geometries and estimation of crystal structure by X-ray diffraction techniques.
3. Students demonstrate the ability to identify and apply appropriate analytical and mathematical tools of physics in solving engineering problems.
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.
5. Student's ability to understand the principles in the production and applications of lasers and their effective utilization in optical communication and detection.
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.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2									
CO2	2		2	2								
CO3		1		2	2							
CO4			2	2	3							
CO5		1	1	2								

CYT01 Engineering Chemistry

Instruction Hours / Week : 3 **Credits: 3**

Common to all branches

Course Objectives:

1. To provide the information regarding hardness of water, effects of hard water in boilers and treatment methods to avoid bad effect on human health. And also to check the parameters of various water samples by experimental techniques.
2. To make students familiar with importance of electrochemical processes in nature and industry, like the coating of objects with metals or metal oxides through electro deposition, also to provide the information about new technological solar batteries.
3. To provide knowledge on the fuel properties to help in selecting good fuel for reducing the pollution based on its efficiency without much smoke and also to make aware of synthetic fuels.
4. To make aware of the design synthesis and analysis of polymers and their multi-faceted applications in Engineering, Airplane engineering and bio-medical engineering.
5. To make aware of compounding and processing of polymers and description of major polymers, structure property relations and application and to provide their relevance in the electric and electronic fields.
6. To provide the knowledge of manufacturing of cement and analysis of cement and also the classification and properties of refractories and ceramics.

Syllabus

UNIT-I:

WATER TREATMENT: Introduction – Effect of water on rocks and minerals – hardness of water – disadvantages of hard water – boiler feed water – scale and sludge formation in boilers – caustic embrittlement – boiler corrosion – priming and foaming – softening methods-lime soda, zeolite and ion exchange process-Specification of potable water and purification of Drinking water – chemical analysis of water-Hardness, acidity, alkalinity, chloride and dissolved oxygen.

UNIT –II:

ELECTRO CHEMISTRY AND CORROSION: Electrode potential – reference electrodes – hydrogen,

calomel and glass electrode – PH and its determination –batteries – fuel cells – aluminum air battery – solar battery – lead acid storage cell.-Corrosion: Types of corrosion – factors influencing corrosion – theories of corrosion – prevention of corrosion – cathodic protection – metallic coatings – hot dipping, spraying, cementation, cladding and electro plating.

UNIT –III:

FUELS AND COMBUSTION: Introduction – classification of fuels – calorific value and its determination – bomb calorimeter – Boy's gas calorimeter – theoretical calculation of calorific value of fuel – coal – analysis of coal – metallurgical coke – petroleum –refining of petroleum- synthetic petrol – octane and cetane number– combustion – mass analysis from volume analysis and vice versa – analysis of flue gas by Orsat's apparatus.

UNIT –IV:

HIGH POLYMERS: Nomenclature of polymers – types of polymerization-Plastics – classification of plastics – moulding constituents of plastics– preparation, properties and applications of polythene, nylon, Teflon, and bakelite – Rubbers – vulcanization of rubber –compounding of rubber- synthetic rubbers-buna-N, thiocol and silicon rubbers- Lubricants-classification-mechanism-properties of lubricating oils-selection of lubricants for engineering applications.

UNIT–V:

BUILDING MATERIALS: Manufacture-dry and wet processes-setting and hardening of cement-analysis of cement. Refractories-classification-properties and engineering applications. Ceramics-classification-properties and engineering applications

Books Recommended:

1. Engineering Chemistry : PC Jain & M Jain-Dhanpatrai publishing company, New Delhi
2. Engineering Chemistry : BK Sharma
3. Engineering Chemistry : SS Dhara
4. Physical Chemistry : Puri& Sharma-Vishal Pulishing Company(VPC), Jalandhar
5. Physical Chemistry : Bahl&Tuli-

6 Polymer Science- :Gowarikar-

7 Physical Chemistry by : Glasstone-

Course Outcomes:

1. To understand the importance of the water and its quality
2. To identify uses of electrochemical processes in nature and industry
3. To understand properties of good fuel for reducing auto exhaust gases to the environment
4. To understand synthesis, properties and engineering applications of polymers
5. To know the procedure and analysis of cementing materials

Mapping of Course Outcomes with Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1				2	2					1
CO2		1		2		1	1					
CO3		2			1		2					2
CO4				1	1		2					
CO5	1			1	2		1					

EET02 Circuit Theory

Instruction Hours / Week : 4 **Credits: 4**

Common to all branches

Course Objectives:

1. To provide fundamentals of electrical circuits.
2. To understand concepts of network topology, Two-port networks.
3. To learn the network theorems and its applications.
4. To understand transient analysis,, Analog filter design

UNIT – I

Basic Circuit Concepts: Active and passive elements – Ideal and practical sources – Source transformation – v-i characteristics of R, L, and C elements – Kirchhoff's laws – Star-delta transformation – Network reduction techniques - Mesh and Nodal Analysis –Concept of mutual inductance – Concept of coupling and dot convention

UNIT – II

Network Topology: Graph, tree, incidence matrix, and tie set and cut set matrices – Formulation of equilibrium equations based on graph theory. Duality and dual circuits.

A.C. Fundamentals: Periodic waveforms – Average and effective values of different waveforms – Form factor and crest factor

UNIT – III

A.C. Circuits: Phase and phase difference – Phasor notation – Concept of reactance, impedance, susceptance, and admittance – Active and reactive power – Power factor – Power triangle -Response of R, L, and C elements for sinusoidal excitation – Steady state analysis of RL, RC, and RLC circuits for sinusoidal excitation – Phasor diagrams. Steady state analysis of ac circuits using mesh and nodal analysis.

UNIT – IV

Resonance: Series and parallel resonance – Half power frequencies, bandwidth, Q factor and relations between them.

Locus diagrams: Current and Impedance locus diagrams of RL and RC series circuits and two branch parallel circuit

UNIT – V

Network theorems: Superposition – Thevenin's and Norton's theorems – Millman's theorem – Reciprocity theorem – Tellegen's theorem – Compensation theorem and application of the theorems for dc circuits and sinusoidal steady state circuits – Maximum power transfer theorems for dc and ac circuits

Text Books:

1. Hayt, Kemmerly and Durbin, Engineering Circuit Analysis, 6th edition, Tata McGraw-Hill
2. Sudhakar and Shyammohan, Network analysis and synthesis, Tata McGraw-Hill

Reference Books

1. Ravish R. Singh, Electrical Networks, and Tata Mc. Graw Hill.
2. Edminster, Electric Circuits – (McGraw Hill Schuam series 1st edition)

CO1 Match concepts in trigonometry, complex algebra, and matrix algebra to utilize techniques, skills, and modern engineering tools necessary for electrical engineering practices.

CO2 Select proper network reduction techniques, circuital laws and theorems for magnetic / electric circuit solution considering economic, performance, efficiency and availability constraints.

CO3 Estimate parameters for different types of attenuators and filters used in signal modulation for power systems and communication systems.

CO4 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.

CO5 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

CO6 Apply computer mathematical and simulation programs to solve various real life multi- disciplinary topics through circuit solution.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3				3							1
CO2	2	1			1	2			2			1
CO3			1		2	2	2	1			2	
CO4		1	2		1	2	2	1	2			2
CO5		1		1		1	1					1
	2	2							2			1

MET01 Engineering Graphics

Instruction Hours / Week : 5 **Credits: 4**

Common to all branches

Course Objectives:

1. Students are to learn fundamentals of engineering graphics as it applied to basic engineering core course.
2. To provide the knowledge of construction of basic scales, conics, ellipse, parabola and hyperbola.
3. To impart knowledge about the construction of Cycloidal curves.
4. To understand the concepts of first angle and third angle projections of drawing.
5. To understand the concepts of projections of plane surfaces, solids, cylinders and cones.
6. To have thorough understanding of sections of solids and orthographic projections.

Syllabus

UNIT-I

Scales, plane scale, diagonal scale Practices

Conics- construction of Ellipse, parabola and Hyperbola by eccentricity method

Ellipse- Concentric circles and Oblong methods, Rectangular hyperbola

UNIT-II

Construction of cycloidal curves- epi cycloid and hypocycloid, Involutes- Circle, Polygon

UNIT-III

Projection of points-Principles of Projections, First and Third angle projections, projections of points

Projection of Lines- Projection of straight Lines, lines inclined to one plane and parallel to the other, Lines inclined to both planes, True length and true inclinations, Location of traces

UNIT-IV

Projection of Plane surfaces and solids-Projection of Polygonal surfaces and circular lamina inclined to both planes. Projection of right regular solids- Projection of simple solids such as Prisms, Pyramids, Cylinders and Cones with their axes perpendicular to anyone of the Principal planes and inclined to the other.

UNIT-V

Section of Solids- Sections of above solids in simple vertical position resting on their base, by cutting planes inclined to one reference plane and perpendicular to the other-True shape of the sections. Orthographic Projections- Conversion of Pictorial views into orthographic views of simple objects.

Text Books:

1. **Bhatt N.D. and V.M. Panchal,** Engineering Drawing Revised Edition, Charotar Publications, 2001.
2. **Dhananjaya A Jolhe,** Engineering Drawing with an introduction to Auto CAD, Tata MeGrawhill -2009
3. **K.L.Narayana and P. Kannaih,** A text Book of Engineering Drawing, Scitech Publications – 1999.
4. **Venugopal,K.,** Engineering Drawing and Graphics, New Age International Publishers

Course Outcomes: At the end of the course, the student will be able to

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 projections of lines, planes, solids and sections of solids.
5. Draw orthographic projections of lines, planes, and solids.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1			1	1					
CO2	2	1				1	1					
CO3		2		2		2						1
CO4			1	2			1					
CO5		1		2		3						

CSP02 Data Structures Lab

Instruction Hours / Week : 3 **Credits: 2**

Common to all branches

Course Objectives:

1. Arm the students with the basic programming concepts.
2. Arm the students with the necessary constructs of C++ programming.
3. Choose the appropriate data structure and algorithm design method for a specified application.
4. To Gain knowledge in practical applications of data structures.

Syllabus

1. Write a C++ Program to create a sequential file with at least 5 records, each record having thestructure shown below:

USN	Name	Marks1	Marks2	Marks3
Non-zero Positiveinteger	25 Characters	Positive Integer	Positive Integer	Positive Integer

Write necessary functions

a. To display all the records in the file.

b. To search for a specific record based on the USN. In case the record is not found, suitable message should be displayed. Both the options in this case must be demonstrated.

2. Write and demonstrate the following C++ functions:

   a. newStrCpythat does the same job as **strcpy**

   b. **newStrCat** that does the same job as **strcat** without using any library functions.

3. Write a C++ Program, which accepts the Internet Protocol (IP) address in decimal dot format(ex. 153.18.8.105) and converts it into 32-bit long integer (ex. 2568095849) using **strtok** library function and unions.

4. Write a C++ Program to construct a **stack of integers** and to perform the following operations on it:

   a. Push

   b. Pop

   c. Display

The program should print appropriate messages for stack overflow, stack underflow, and stack empty.

5. Write a C++ Program to convert and print a given valid parenthesized **infix** arithmetic expression to **postfix** expression. The expression consists of single character operands and the binary operators+ (plus), - (minus), * (multiply) and / (divide).
6. Write a C++ Program to evaluate a valid **suffix/postfix** expression using stack. Assume that thesuffix/postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators are + (add), - (subtract), * (multiply) and / (divide).
7. Write a C++ Program to simulate the working of a **queue of integers** using an array. Provide the following operations:
   a. Insert b.
   Delete c.
   Display
8. Write a C++ Program to simulate the working of a **circular queue of integers** using an array. Providethe following operations:
   a. Insert
   b. Delete
   c. Display
9. Write a C++ Program using dynamic variables and pointers, to construct a singly linked list consisting of the following information in each node: student id (integer), student name (character string) and semester (integer). The operations to be supported are:
   a. The insertion operation
      i. At the front of a list ii.
      At the back of the list
      iii. At any position in the list
   b. Deleting a node based on student id. If the specified node is not present in the list an error Message should be displayed. Both the options should be demonstrated.
   c. Searching a node based on student id and updates the information content. If the specified Node is not present in the list an error message should be displayed. Both situations shouldbe displayed.
   d. Displaying all the nodes in the list.
   (Note: Only one set of operations among a, b and c with d may be asked in the examination)
10. Write a C++ Program using dynamic variables and pointers to construct a **stack of integers**
    using**singly linked list** and to perform the following operations:
    a. Push
    b. Pop
    c. Display
    The program should print appropriate messages for stack overflow and stack empty.
11. Write a C++ Program using dynamic variables and pointers to construct a **queue of integers**
    using **singly linked list** and to perform the following operations:
    a. Insert b.
    Delete c.
    Display
    The program should print appropriate messages for queue full and queue empty.

12. Write a C++ Program to support the following operations on a **doubly linked list** where each node consists of integers:
    a. Create a doubly linked list by adding each node at the front.
    b. Insert a new node to the left of the node whose key value is read as an input
    c. Delete the node of a given data, if it is found, otherwise display appropriate message.
    d. Display the contents of the list.
    (Note: Only either (a, b and d) or (a, c and d) may be asked in the examination)
13. Write a C++ Program
    a. To construct a **binary search tree** of integers.
    b. To traverse the tree using all the methods i.e., **inorder, preorder and postorder**.
    c. To display the elements in the tree.
14. Write recursive C++ Programs for
    a. Searching an element on a given list of integers using theBinary Search method.
    b. Solving the **Towers of Hanoi problem**.
15. Implement programs for structures and graphs with pointers and without pointers by taking examples.

Text Books:

B.A.Forouzan,Cengage Learning.

1. Programming Principles and Practice using C++,B.Stroustrup, Addison Wesley (Pearson education).
2. Data Structures and STL, W.J.Collins,McGrawHill,International edition.
3. Data structures and Algorithms with OODesign patterns in C++, B.R.Priess, John Wiley & sons.
4. The Art, Philosophy, and Science of OOP with C++, RickMiller, SPD.

C++ for Programmers, P.J.Deitel and H.M.Deitel, PHI/Pearson

Course Outcomes:

1. 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 identity the appropriate data structure for given problem.
4. Have practical knowledge on the application of data structures.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2		1	2	1						
CO2	1	2	1		1	1						
CO3		1	2	2								
CO4		1	2	1	2							

MEP01 Workshop Practice

Instruction Hours / Week : 3 **Credits: 2**

Common to all branches

Course Objectives:

1. To impart training to the students in different crafts of workshop.
2. To make known about the importance of Carpentry, Welding in our daily life.
3. To identify what are runners, risers in a foundry shop, and welding equipment used in Gas welding and Arc welding.
4. To identify different smithy tools used in tin smithy.

Syllabus

Carpentry

Wood sizing exercise in planning, marking, sawing, chiseling and grooving to prepare

1. Half – lap joint
2. Dove – tail joint
3. Tenon joint

Fitting

Markings, cutting and filing to prepare

1. Straight fitting
2. V – fitting
3. Square fitting

Tin smithy

Markings, bending and cutting to prepare

1. Round tin
2. Square tin

Foundry

Ramming and placing of riser and runner to prepare the moulds for the following

1. Two – stepped pulley
2. Three – stepped pulley
3. Dumbell

Welding

Preparation of

1. Lap joint
2. Butt joint
3. T – joint

Course Outcomes: At the end of the course, the student will be able to

1. 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.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1		1		1	1						1
CO2	1		2		2	2						
CO3		1		3	3	2						
CO4			1	2	2							1
CO5			1		2	2						1

III **SEMESTER**

MAT 03 **ENGINEERING MATHEMATICS-III**

(Common to all branches)

No.of Credits:4 No.of Instruction Hours/Week:5

UNIT I

Complex analysis - I: Analytical functions - Cauchy-Reimann equations – Construction of Analytic functions- Complex integration - Cauchy's theorem - Integral formula - Evaluation of integrals.

UNIT II

Complex analysis - II: Taylor's and Laurents' series- Transformations- Conformal mapping - Bilinear transformations - Transformation of $1/z$, z^2, sin z and cos z.

UNIT III

Complex anaylasis –III: Singularities - Poles - Residues - Residue theorem – Contour integration- Evaluation of real integrals

UNIT IV

Partial differential equations - I : Formation of differential equations - Classification - First order linear partial differential equations – Legranges' linear equation - Method of multipliers - first order non-linear partial differential equations - Charpits method.

UNIT V

Partial differential equations - II: Method of separation of variables - One dimensional wave equation - Heat equation – Laplace's equation.

Text Books:

1. Grewal B S, Higher Engineering Mathematics, 40th Edition, Khanna Publications, 2007.
2. Venkataraman M K, Engineering Mathematics, Vol. I & II, National Publishing Company, 1993.
3. Venkataraman M K, Engineering Mathematics, National Publishing Company, 1995.
4.Grewal B S, Engineering Mathematics, 13th Edition, Khanna Publications.
5.Kreyszig E, Advanced Engineering Mathematics, 8th edition, Wiley, 1998.

Course Outcomes:

CO1	Perform operations on various discrete structures such as sets, functions, relations, and sequences.
CO2	Ability to solve problems using Counting techniques, Permutation and Combination, Recursion and generating functions.
CO3	Apply algorithms and use of graphs and trees as tools to visualize and simplify Problems.
CO4	Understand the various properties of algebraic systems like Rings, Monoids and Groups

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1		2		1		2	
CO2	3	3	2	1		2		1		2		2
CO3	2		2	3		1		2				
CO4	3	3	1		3		2		2	1		2

CST 03 **DIGITAL LOGIC DESIGN**

No.of Credits:3 No.of Instruction Hours/Week:4

UNIT I

Number Representation: Positional number representation, Representation of integers, real numbers, and characters, BCD representation.

Boolean Algebra and Logic Gates: Basic definitions, Axiomatic definition of Boolean algebra, Basic theorems and properties of Boolean algebra, Boolean functions, Canonical and Standard forms, Introduction to CAD tools.

Implementation Technology: Transistor switches, NMOS and CMOS logic gates, Standard chips, Practical aspects - Noise margin, Dynamic operation of logic gates, Fan-in and Fan-out in logic gates.

UNIT II

Combinational Circuit Building Blocks: Multiplexers, De-multiplexers, Encoders, Decoders, Code converters, Comparators, Parity generators, and checkers.Optimized Implementation of Logic Function: Karnaugh map, Strategy for minimization, Minimization of product of sums, and sum of product forms, Incompletely specified functions, Multiple output circuits.

UNIT III

Algorithmic approach for logic minimization - Quine-McCluskey method.

Arithmetic Circuits: Addition of unsigned and signed numbers, Fast adders, Multiplication of signed integer and floating point numbers.Synthesis of logic functions using multiplexers, Programmable logic devices such as PLA, PAL, CPLDs, FPGAs, ASICs.

UNIT IV

Sequential Circuits: The concept of a sequential circuit, SR flip-flops, D, JK, and T flip-flops, Various clock triggering mechanisms, Master-Slave flip flops; The concept of asynchronous and synchronous sequential circuits, Shift registers, Counters.

UNIT V

Sequential Circuits: Basic design steps - State diagram, State table, State assignment, Choice of flip-flops and derivation of next state and output, timing diagram; State assignment problem, Mealy state model, State minimization, Analysis of synchronous sequential circuits, ASM charts, Formal model for sequential circuits.

Asynchronous Sequential Circuits: Asynchronous behavior, Analysis of asynchronous circuits, synthesis of asynchronous circuits, Hazards - static, dynamic; Significance of hazards.

Text Books:

1. Brown S, and Vranesic Z, Fundamentals of Digital Logic with VHDL Design, 3rd edition, McGraw Hill, 2012.
2. Kinney L L, and Roth Jr. C H, Fundamentals of Logic Design, 7th edition, Cengage Learning, 2015.

Reference Books:

1. Mano M M, and Kime C, Logic and Computer Design Fundamentals, 4th edition, Pearson Education, 2013.
2. Hamacher C, Vranesic Z, & Zaky S, Computer Organization, 5th edition, McGraw-Hill, 2011.
3. Wakerly J F, Digital Design: Principles and Practices, 4th edition, Pearson Education, 2008.
4. Kohavi Z and Jha N K, Switching and Finite Automata Theory, 3rd edition, Cambridge University Press, 2010.
5. Peterson G R, Hill F J, Introduction to Switching Theory & Logical Design, 3rd edition, Wiley, 2009.

Course outcomes:

CO1	Understand different Number systems, Codes, Logic Gates, Boolean laws &theorems.
CO2	Simplify the Boolean functions to the minimum number of literals.
CO3	Design & implement different types of combinational logic circuits using Logic gates
CO4	Design & implement different types of sequential logic circuits using Flip Flops.
CO5	Design & implement different types of Counters, Registers, and Programmable Logic Devices.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		3							3	3
CO2	3	1	2	2	3				3			3
CO3	3	3	3	3	3		1		1	2		1
CO4	3	2	3	3	2		2		3	2		2
CO5	3	3	2	2	3	3	2	2		3	1	3

CST 04

DISCRETE MATHEMATICAL STRUCTURES

No.of Credits:4 No.of Instruction Hours/Week:4

UNIT I

Logic, Prepositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy

UNIT II

Sets, Set Operations, Functions, Sequences and Summations.
Relations and their properties, n-ary relations and their applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings, Lattices.

UNIT III

Counting – Basics of Counting, Pigeonhole Principle, Permutations and Combinations, Binomial Coefficients, Generalized Permutations and Combinations, Generating Permutations and Combinations.
Advanced Counting Techniques – Recurrence Relations, Solving Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-and-Exclusion and its Applications.

UNIT IV

Introduction to graphs, Graph terminology, Applications of some special graphs, Representation of graphs, Graph isomorphism.
Connectivity: Connectedness in undirected and directed graphs, Paths and Isomorphism, Construction of reliable communication networks, Euler path, Hamilton path, Chinese postman problem, Shortest

path problems, Traveling salesman problem.

UNIT V

Planar graphs - Kuratowski's theorem – Graph coloring – Timetabling problem.
Introduction to trees, Application of trees, Tree traversal, Spanning trees, Applications of backtracking, Minimum spanning trees, Flows, Cuts, Max-flow Min-cut problem.

Text Books:

1. Kenneth H Rosen, *Discrete Mathematics and its Applications*, 7th edition, McGraw-Hill Companies.
2. Mott J L, Kandel A, and Baker T P, *Discrete Mathematics for ComputerScientists and Mathematicians*, 2nd edition, PHI, 2004.

Reference Books:

1. Malik D S, Sen M K, *Discrete Mathematical Structures: Theory andApplications*, Thomson Course Technology, 2004.
2. Mott J L, Kandel A, and Baker T P, *Discrete Mathematics for ComputerScientists and Mathematicians*, 2nd edition, PHI, 2004.
3. Kolman B, Busby R C, Ross S C, and Rehman N, *Discrete MathematicalStructures*, 5th edition, Pearson Education, 2006.
4. Lipschutz S, Lipson M, *Discrete Mathematics*, 2nd edition, TMH, 2006.

Course Outcomes

CO1	For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives
CO2	For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference
CO3	For a given a mathematical problem, classify its algebraic structure
CO4	Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
CO5	Develop the given problem as graph networks and solve with techniques of graph theory.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3		1			2			2	
CO2	2	3		2		2			2			
CO3	3	2		1		1						
CO4	1	2					2			2		
CO5	3	3		1		2				3		

ECT 41 ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING

No.of Credits:3 No.of Instruction Hours/Week:3

UNIT I

Basic Electronic Devices: Semiconductor fundamentals, Principle of operation and V-I Characteristics of Diodes (PN, Zener, Photo, LED, Laser Diode), Transistors (BJT, JFET, MOSFET). Microelectronics: Concept of miniaturization of electronic systems, Basic principles of monolithic integrated circuit technology, IC fabrication of simple circuit elements.

UNIT II

Transistor Amplifiers: Concept of an amplifier -Gain, Input and Output impedance, Frequency response, Biasing of a transistor, CB, CE and CC Configurations and their characteristics, Multi stage Amplifiers.

Concept of feedback: Negative and Positive feedback, Advantages and limitations, Oscillator Operation, RC phase shift oscillator and Crystal oscillator.

UNIT III

Analog ICs: Concept of differential amplifier, Operational Amplifier (OPAMP), Characteristics of an OP AMP and its applications - Inverting and non-inverting amplifiers, Summer, Integrator, Differentiator.555 timer, and its application as multi-vibrator, Phase Locked Loop (PLL), and its application as frequency multiplier.

UNIT IV

Basics of Communication Engineering: Introduction, Signal Spectrum, Bandwidth, Noise; Concept of Communication - Source, Channel, Sink; Types of channels; Concept of information and entropy, Shannon's law, Bit rate; Analog Modulation Schemes - AM, FM; Pulse Modulation Schemes – sampling,PAM,PWM,PPM,PCM,DM; Multiplexing – FDM,TDM.

UNIT V

A/D and D/A Converters: D to A converters- Basic principle, Weighted resistor and ladder types; A to D Converters - Basic principle, Ramp, Successive approximation types.

Basic Electronics Instruments: Block diagram and principle of operation of - Digital Multi-meter, Function generator, Cathode Ray Oscilloscope (CRO).

Text Books:

1. Bogart Jr. T F, Beasley J S, and Rico G, Electronic Devices and Circuits, 6th edition, Pearson Education, 2006.
2. Malvino A, and Bates D J, Electronic Principles, 7th edition, Tata McGraw-Hill, 2007.

Reference Books:

1. Deshpande N P, Electronic Devices and Circuits - Principles and Applications, Tata McGraw-Hill, 2007.
2. Muthusubramanian R, Salivahanan S, and Muraleedharan K A, Basic Electrical, Electronics, and Computer Engineering, 2nd edition, Tata McGraw-Hill, 2001. (Part II-Electronics Engineering only)
3. Stanley W D, Hackworth J R, and Jones R L, Fundamentals of Electrical Engineering and Technology, Thomson Delmar Learning, 2007. (Part III - Electronic Devices and Linear Electronics only)
4. Gates E D, Introduction to Electronics, 5th edition, Thomson Delmar Learning, 2007. (Sections 3and4only)

5. Storey N, Electronics - A Systems Approach, 2nd edition, Pearson Education Asia, 2001.

Course outcomes:

CO1	Know the characteristics of diodes and transistors
CO2	Design simple circuits and mini projects.
CO3	know the benefits of feedback in amplifier
CO4	Compare and classify oscillators.
CO5	Know the characteristics of diodes and transistors

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		3	2	2	2	2	2	1	3	2
CO2	2	3	2	3	3	2				2		3
CO3		2		3				2				
CO4	3	3	2				3	1	2	2	2	2
CO5		3		3	3	2						

CST 05 JAVA AND ADVANCED DATA STRUCTURES

No.of Credits:3 No.of Instruction Hours/Week:3

UNIT – I

Core Java Programming: Introduction to Java programming; Object-oriented programming with Java Classes and Objects; Inheritance; Exception handling with try-throw-catch-finally constructs; The Object class; Working with types: Wrapper classes; Packages; Applets; Event Handling; Basics of AWT and Swing; Threads; The I/O Package; Basic concepts of networking; Database connectivity with JDBC;

UNIT – II

Structure of an HTML document; Static, Interactive, Dynamic, and Active Web Pages,DHTML,CSS, JavaScript - The Interpreted Programming Language; Apache, ApacheTomcat, IIS Web Servers; Microsoft SQL, MySQL, and Oracle Database Servers.

UNIT – III

Advanced Java Programming (J2EE): Java Database Connectivity; Java Servlets; Java Server Pages; Remote Method Invocation(RMI); Enterprise Java beans(EJB); Session Bean; XML; Hibernate; AJAX; STRUTS;

UNIT – IV

Reclaiming Space in Files, Internal Sorting Methods, Keysorting. External Searching Mechanisms - Indexing and Hashing, Multilevel Indexing.
Revision of AVL Trees, Paged Binary and B-Trees; Use of B-Trees in Multilevel Indexing; Indexed Sequential File Access and B+-Trees. Variants of B-trees and B+-Trees.

UNIT – V

Concepts of Static and Extendable Hashing, Hashing Methods; Collision Resolution Techniques; Effects of Hashing Methods, Collision Resolution Techniques, Packing Density, Bucket Size, Hash Table Representations and Deletion Methods on the Performance of External Searching. Role of Radix 2 Tries in Extendible Hashing; Transforming a Trie into Directory and Performing Insertion, Deletion and Searching Operations; Extendible Hashing Performance.

Text Books:

1. Herbert Schildt, Java - The Complete Reference, 8th Edition, Mcgraw Hill Education, 2011.
2. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wiley India, 2009.
3. Jim Keogh, J2EE - The complete Reference,1st Edition, McGraw Hill Education, 2017.
4. Hans Bergsten, Java Server Pages, 3rd Edition, O'Reilly, 2003.
5. Folk M J, Zoellick B, and Riccardi G, File Structures - An Object-Oriented Approach with C++, Pearson Education, 1998.

Reference Books:

1. Tremblay J P, Sorenson P G, An Introduction to Data Structures with Applications, Tata-McGraw Hill, 1991.
2. Sahni S, Data Structures, Algorithms and Applications in C++, 2nd edition, Universities Press, 2005.
3. James Holmes, Struts: The Complete Reference, 2nd Edition, McGraw Hill Education, 2007.
4. David C. Kreines, Oracle SQL: The Essential Reference, 1st Edition, O'Reilly, 2000.
5. Steve Suehring, MySQL Bible, Wiley, 2002.

Course outcomes:

CO1	Identifying classes, objects, members of a class and the relationships among them needed for a specific problem.
CO2	OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
CO3	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.
CO4	Design to create structure of web page(more dynamic and interactive), to store the data in web document, and transport information through web.
CO5	Identify the problems in Servlets and overcome those using Java Server Pages also develop JSP applications with Model View Control architecture.
CO6	Choosing the best Data structure for solving their Real time problems.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	3	-	-	-	-	2	3
CO2	3	3	1	-	3	-	3	-	3	-	2	3
CO3	3	3	2	1	3	-	-	-	3	-	3	1
CO4	-	-	3	3	3	-	3	-	3	-	-	2
CO5	-	-	-	3-	3	2	-	2	3	-	3	3

MAT 04 **PROBABILITY AND STATISTICS**

No.of Credits:4 No.of Instruction Hours/Week:5

UNIT I

Probability:Introduction, Axiomatic approach, Conditional probability, Baye's theorem, Stochastic process, Random variables, Discrete and Continuous distributions, Expectation, Variance, moments, Moments generating functions.

UNIT II

Distributions - Binomial, Poisson, Normal, Uniform, Exponential and Gamma. Properties and applications.

UNIT III

Estimator-Estimation of parameters by Method of moments and maximum likelihood-Testing of hypothesis-small sample tests-t-test, F-test and Chi-Square test.

UNIT IV

Correlation : Curve fitting by method of least squares-Linear, Quadratic and Exponential fitting-Correlation-rank correlation-Regression analysis-Multiple correlation.

UNIT V

Quality Control: Concept of quality of a manufactured product-Causes of variation-Principle of Shewart Control charts-X-Chart, R-Chart, p-Chart, np-chart and C-Chart.

Text Books:

1. S P Gupta, Statistical Methods, 38th Edition, Sultan Chand & Sons Educational Publishers,2009.
2. Y K V Iyengar, et al, Probability and Statistics 2nd Edition S. Chand & Company Ltd,2010.
3. S C Gupta and V K Kapur, Fundamentals of Applied Statistics, 3rd Edition, Sultan Chand& Sons Educational Publishers.

Course outcomes:

CO1 The objective of this course is to familiarize the students with statistical techniques.

CO2 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.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	1		2		3			2	
CO2	3	3		2		1	2		1			2

ECP 01 ELEMENTS OF ELECTRONICS AND COMMUNICATION LABORATORY

No.of Credits:2 No.of Instruction Hours/Week:3

List of Experiments :

1. Study of CRO and measurements using it.
2. PN Diode & Zener diode characteristics
3. BJT input & Output Characteristics
4. MOSFET input &Transfer Characteristics
5. Common Emitter Amplifier
6. Applications of OP AMP – 1
7. Applications of OP AMP – 11
8. 555 Timer Based Multi-vibrators
9. PLL based Frequency Multiplier
10. Divide by N counter using Flip-flops
11. 4-bit shift register using Flip-flops
12. Study of Analog and Pulse Modulation Schemes – Observation of the waveforms of carrier , modulating, and the modulated signals.

Course outcomes

CO1 Understand the diode and transistor characteristics

CO2 Verify the rectifier circuits using diodes and implement them using hardware.

CO3 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

CO4 Analyze the concepts of SCR and observe its characteristics.

CO5 Remember the concepts of unipolar junction transistor and observe its characteristics

CO6 Understand the construction, operation and characteristics of JFET and MOSFET, which can be used in the design of amplifiers.

CO7 Understand the need and requirements to obtain frequency response from a transistors that Design of RF amplifiers and other high frequency amplifiers is feasible.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		3	2	2	2	2	2	1	3	2
CO2	2	3	2	3	3	2				2		3
CO3		2		3				2				
CO4	3	3	2				3	1	2	2	2	2
CO5		3		3	3	2						

CSP 03 JAVA AND ADVANCED DATA STRUCTURES LABORATORY

No.of Credits:2 No.of Instruction Hours/Week:3

The assignments are given in JAVA
Objects and Methods
Multi/Multiple Inheritance
Polymorphism/Data binding
Parallel Interfaces
Threading Fork
and wait Static
binding Dynamic
binding
Exception handling
Interfaces
Packages
Appelets
Networking
Swings
Java Script
Internal Sorting Methods
Keysorting
External Searching Mechanisms

Course outcomes:

CO1	Implementing classes, objects, members of a class and the relationships among them needed for a specific problem.
CO2	OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
CO3	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.
CO4	Design to create structure of web page(more dynamic and interactive), to store the data in web document, and transport information through web.
CO5	Identify the problems in Servlets and overcome those using Java Server Pages also develop JSP applications with Model View Control architecture.
CO6	Choosing the best Data structure for solving their Real time problems.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	3	-	-	-	-	2	3
CO2	3	3	1	-	3	-	3	-	3	-	2	3
CO3	3	3	2	1	3	-	-	-	3	-	3	1
CO4	-	-	3	3	3	-	3	-	3	-	-	2
CO5	-	-	-	3-	3	2	-	2	3	-	3	3
Co6	3	3	3	3	2	3	2	-	2	-	2	1

IV **SEMESTER**

CST 06 **COMPUTER ORGANIZATION**

No. of Credits:4 No. of Instruction Hours/Week:4

UNIT I

Structure of Computers: Introduction, Performance, Memory addressing and Operations, Instructions and Instruction sequencing, Addressing modes, Basic l/0 operations, Pushdown stacks, Subroutines, Encoding of machine instructions, Brief description and functional classification of IA-32 Pentium instruction set

UNIT II

Basic Processing Unit: Fundamental concepts, Single and Multiple bus organization, Hardwired control, Multiprogrammed control – Microinstructions, Microprogram sequencing, Wide-branch addressing, Microinstructions with next-address field, Prefetching microinstructions.
Arithmetic:Multiplication – Booth algorithm; Integer division, Floating-Point Addition- Subtraction.

UNIT III

The memory System: Basic concepts, RAM and ROM Memories and their internal organization, Cache Memories - Mapping functions, Replacement algorithms; Performance Considerations, Virtual Memories, Secondary Storage.

UNIT IV

Input/ Output Organization: Accessing l/O devices; Interrupts –Enabling and disabling, Handling multiple devices; Direct Memory Access - Bus Arbitration; Buses – Synchronous and Asynchronous; Interface circuits – Parallel port, Serial port

UNIT V

Pipelining: Basic concepts, Data hazards, Instruction hazards, Influence on instruction sets,Data path and control considerations, Superscalar operation.
Processor Families: The ARM family, The Motorola 680x0 and Coldfire families, The IA-32 family.

Text Books

1. Hamacher C, Vranesic Z, and Zaky S, Computer Organization, 5th edition, McGraw-Hill

Reference Books

1. Heuring V P, and Jordan H F, Computer systems Design and Architecture Addison-Wesley
2. Carpinelli J D, Computer System Organization and Architecture. Addison-Wesley 2001
3. Mano M M, Computer system Architecture, 4th edition, Pearson Education Asian 2002

Course outcomes:

CO1	To know the **architecture of a computer**.
CO2	To learn ALP Programming
CO3	Write a flowchart for Concurrent access to memory and cache coherency in **Parallel Processors** and describe the process.
CO4	Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
CO5	Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3		2		1		2		1	
CO2	3	3	2	2		1		3		2		1
CO3	3	2	1		2		2		1		2	
CO4	2	3		3		2	1					
CO5	2	1		2		1		2		2		

CST 07 DATA BASE MANAGEMENT SYSTEMS

No.of Credits:3 No.of Instruction Hours/Week:3

UNIT-I

The Worlds of Database Systems-The Evolution of Database Systems, Overview of a Database Management System

The Relational Model of Data- An Overview of Data Models, Basics of the Relational Model, Defining a Relation Schema in SQL,An Algebraic Query Language, Constraints on Relations

Design Theory for Relational Databases- Functional Dependencies, Rules About Functional Dependencies, Design of Relational Database Schemas,

Decomposition: The Good, Bad, and Ugly, Third Normal Form, Multivalued Dependencies

UNIT-II

High-Level Database Models- The Entity/Relationship Model, Design Principles, Constraints in the E/R Model, Weak Entity Sets, From E/R Diagrams to Relational Designs, Converting Subclass Structures to Relations, Unified Modeling Language,From UML Diagrams to Relations, Object Definition Language, From ODL Designs to Relational DesignsAlgebraic and Logical Query Languages- Relational Operations on Bags, Extended Operators of Relational Algebra, A Logic for Relations, Relational Algebra and Data log.

UNIT-III

The Database Language SQL- Simple Queries in SQL, Queries Involving More Than One Relation, Subqueries, Full-Relation Operations, Database Modifications, Transactions in SQL

Constraints and Triggers- Keys and Foreign Keys, Constraints on Attributes and Tuples, Modification of Constraints, Assertions, TriggersViews and Indexes- Virtual Views, Modifying Views, Indexes in SQL, Selection of Indexes, Materialized ViewsSQL in a Server Environment- The Three-Tier Architecture, The SQL Environment, The SQL/Host-Language Interface, Stored Procedures, Using a Call-Level Interface, JDBCProgramming Languages for XM- XPath, XQuery, Extensible Stylesheet Language

UNIT-IV

Index Structures- Index-Structure Basics, B-Trees, Hash Tables, Multidimensional Indexes, Hash Structures for Multidimensional Data,Tree Structures for Multidimensional Data, Bitmap Indexes

More About Transaction Management- Serializability and Recoverability, Deadlocks, Long-Duration Transactions

UNIT-V

Parallel and Distributed Databases- Parallel Algorithms on Relations, The Map-Reduce Parallelism

Framework, Distributed Databases,Distributed Query Processing, Distributed Commit, Distributed Locking, Peer-to-Peer Distributed Search

Text Books:

1. J D Ullman, H. Garcia-Molina and J. Widom, *Database Systems: The Complete Book* Prentice-Hall, Englewood Cliffs, NJ, 2002.
2. Jeffrey A. Hoffer, Ramesh Venkataraman, Heikki Topi:Modern Database Management, Pearson, 2015.
3. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems,Third Edition, McGraw-Hill 2003.

Reference Books:

1. Silberschatz A, Korth H F, and Sudarshan S, Database System Concepts, 5th edition, McGraw-Hill, 2006.Ramakrishnan R, and Gehrke J, Database Management Systems, 3rd edition,McGraw-Hill, 2003.
2. Jeffrey A. Hoffer, Ramesh Venkataraman, Modern Database Management, 2015

COURSEOUTCOMES

CO1 Able to apply the concepts and design database for given information system.

CO2 Develop database programming skills in SQL.

CO3 Be familiar with the relational database theory and be able to write relational algebra expressions for queries

CO4 Apply the concepts of Normalization and design database which possess no anomalies.

CO5 Able to write application programs considering the issues like concurrency control, recovery and security.

CO6 Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										3
CO2		1	2	2	3							3
CO3	3	2		3	3							
CO4	3		3	3	2	2	2		3			
CO5		3	2		3			2				

CST08 PYTHON PROGRAMMING LANGUAGE

No.of Credits:3 No.of Instruction Hours/Week:3

UNIT-I

Simple program using Python, Expressions and Values, Variables and Computer Memory, error detection, multiple line statements, Designing and using functions, functions provided by Python, Tracing function calls in memory model, omitting return statement. Working with Text: Creating Strings of Characters, Using Special Characters in Strings, Creating a Multiline String, Printing

Information, Getting Information from the Keyboard. A Boolean Type, Choosing Statements to Execute,

UNIT II

A Modular Approach to Program Organization, Importing Modules, Defining Your Own Modules, Testing Code Semi automatically Grouping Functions Using Methods: Modules, Classes, and Methods, Calling Methods the Object-Oriented Way, Exploring String Methods, Underscores. Storing Collections of Data Using Lists: Storing and Accessing Data in Lists, modifying Lists. Operations on Lists, Slicing Lists, Aliasing, List Methods.

UNIT III

Repeating Code Using Loops: Processing Items in a List, Processing Characters in Strings, Looping Over a Range of Numbers, Processing Lists Using Indices, Nesting Loops in Loops, Looping Until a Condition Is Reached, Repetition Based on User Input, Controlling Loops Using Break and Continue. Reading and Writing Files: Kinds of files, Opening a File, Techniques for Reading Files, Files over the Internet, Writing Files, and Writing Algorithms That Use the File-Reading Techniques, Multiline Records.

UNIT IV

Storing Data Using Other Collection Types: Storing Data Using Sets, Storing Data Using Tuples, Storing Data Using Dictionaries, Inverting a Dictionary, Using the In Operator on Tuples, Sets, and Dictionaries, Comparing Collections. Collection of New Information Object-Oriented Programming: Understanding a Problem Domain,
Function "Isinstance," Class Object, and Class , Writing a Method in Class Book.
Plugging into Python Syntax: More Special Methods.

UNIT V

Creating Graphical User interface: Building a Basic GUI, Models, Views, and Controllers,
Customizing the Visual Style Introducing few more Widgets, Object-Oriented GUIs, Keeping the Concepts from Being a GUI Mess.
Data Structures, GUI Programming, XML with Python

Text Books:

1. Practical Programming: An introduction to Computer Science Using Python, second edition, Paul Gries, Jennifer Campbell, Jason Montojo, The Pragmatic Bookshelf.
2. Exploring Python, Timothy A. Budd, Mc Graw Hill Education

Reference Books:

1. Introduction to Python for Computational Science and Engineering (A beginner's guide), Hans Fangohr.
2. Learning with Python: How to Think Like a Computer Scientist Paperback – Allen Downey, Jeffrey Elkner, 2015
3. Learning Python, Fourth Edition, Mark Lutz, O'Re illy publication

CO1 Define and demonstrate the use of built-in data structures "lists" and "dictionary".

CO2 Design and implement a program to solve a real world problem.

CO3 Design and implement GUI application and how to handle exceptions and files

CO4 Make database connectivity in python programming language.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3		3	2	2	2	3	3	3	3
CO2									2			
CO3		3	3	2	2		3		3		3	3
CO4	2					1		2		2		

MAT 05 COMPUTER ORIENTED NUMERICAL METHODS

No.of Credits:3 No.of Instruction Hours/Week:3

UNIT- I

Errors in Numerical Calculations: Truncation and Round-off errors, Effect of errors in data; Closed form solution versus Iterative methods.

Roots of Nonlinear Equations: Bisection, False position and, Newton-Raphson methods.

UNIT -II

Iterative Solution of Liner Equations - Jacobi iteration, Gauss-Seidel and Relaxation methods; Convergence of iteration methods.

UNIT- III

Interpolation - Lagrange polynomials, Newton's difference formula, Cubic splines, and Two dimensional interpolation.

UNIT- IV

Numerical Differentiation - Differentiating continuous and tabulated functions, Difference tables and Richardson extrapolation. Numerical integration - Trapezoidal, Simpson's 1/3 and Simpson's 3/8 Rules

UNIT-V

Numerical Solution of Ordinary Differential Equations - Taylor's Series, Euler's, Runge-Kutta methods.

Text Book:

1. Schilling R J, and Harries S L, Applied Numerical Methods for Engineers Using MATLAB and C, Thomson Brooks/Cole, 2006.

Reference Books:

1. Chapra S C, Applied Numerical Methods with MATLAB for Engineers and Scientists, 2nd edition, Tata McGraw-Hill, 2007.
2. Gerald C F, and Wheatley P O, Applied Numerical Analysis, 6th edition, Pearson Education Asia, 2002.
3. Niyogi P, Numerical Analysis and Algorithms, Tata McGraw Hill, 2003.
4. Heath M T, Scientific Computing: An Introductory Survey, McGraw-Hill, 1997.

Courseoutcomes:

CO1 Choose the appropriate numerical methods for solving engineering problems using C language.

CO2 Demonstrate understanding of different numerical methods.

CO3 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.

CO4 Compare and distinguish between different numerical methods solving engineering problems giving better optimal results and roots of equation

CO5 Test and evaluate the accuracy of common numerical methods.

CO6 Design and develop numerical methods for solving complex engineering problems by combining numerical algorithms of linear & non-linear equations

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	2			2				3
CO2	3	3										
CO3	3	3	1	2	2							2
CO4	2	2						2				
CO5	3	3	1	3	3							
C06	2	2						3				3

MAT06 COMPUTER ORIENTED OPTIMIZATION TECHNIQUES

No. of Credits: 3 No. instruction hours per week:3

UNIT -I

Overview of Operations Research, Modeling approach, Decision analysis and Games-Decision environments, Decision making under certainty, Decision making under risk, Decision making under uncertainty, Game theory.

UNIT- II

Liner Programming – Formulation, Graphical method, Simplex method, Duality. Formulation of transportation, Assignment and Transshipment models. Goal programming – Formulation, Weighting and Preemptive methods.

UNIT- III

Integer Linear Programming – Applications, Branch and bound, and Cutting plane algorithms.

UNIT- IV

Nonlinear Programming - Sample applications, Graphical illustration of nonlinear programming problems, Types of nonlinear programming problems, One-variable unconstrained optimization, Multivariable unconstrained optimization.

UNIT- V

Karush-Kuhn-Tucker conditions for constrained optimization, Quadratic programming, Separable programming, Convex programming and Non-convex programming.

Text Book:

1. Hillier F S, and Lieberman G J, *Introduction to Operations Research*, 7th edition, Tata McGraw-Hill, 2003.

Reference Books:

1. Taha H A, *Operations Research – An Introduction*, 8th edition, Prentice Hall of India, 2006.
2. Wagner H M, *Principles of Operations Research with Applications to Managerial Decisions*, 2nd edition, Prentice Hall of India, 2004.

3. Tulsian P C, and Pandey V, *Quantitative Techniques – Theory and Problems*, Pearson Education Asia, 2002.

Courseoutcomes:

CO1 Understanding the Concept of optimization and classification of optimization problems.

CO2 Formulation simplex methods variable with upper bounds

CO3 Study the Queuing Model, poison and exponential distributions

CO4 Understand the maximization and minimization of convex functions

CO5 To study equality constraints, inequality constraints

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3		2		1					
CO2	3	2		2				1				
CO3	3	1	2		1			1		2		
CO4	2	2		2								
CO5	3	2		2		2		1				

MET 41 **SIMULATION AND MODELLING**

No. of Credits: 3 No. instruction hours per week: 2

UNIT – I

Introduction to Simulation: Definition, Types of Simulation Models, Applications, System and Environment, Components of System, Advantages and Limitations of Simulation.

UNIT – II

Statistical Distributions: Introduction to Sampling, Discrete and Continuous Distributions, Generation of Random Numbers and Random Variates.

UNIT – III

Mathematical Modelling: Introduction and types of Models, Applications, Simulation of Queueing, Inventory and Manufacturing Systems.

UNIT – IV

Validation of Models: Model Building, Verification, Input and Output Analysis, Comparison of Results of Alternative Systems, Statistical Validation of Models.

UNIT - V

Computer Simulation: Introduction, Simulation Tools and Software, Hardware, Computer Peripherals, Process and Event Orientation, CPU and Memory, Simulation of Systems.

Text Books:

1. Jerry Banks, John S. Carson and Berry L. Nelson and David M Nicol, Discrete Event Simulation; Discrete – Event Simulation, Publisher: Pearson Education, 2007.

Reference Books:

1. Geoffrey Gordon, System Simulation, Publisher: Prentice Hall of India.

Course outcomes:

CO1	Discuss the fundamental elements of discrete-event simulation including statistical models, random processes, random variates, and inputs to simulation
CO2	Analyze a real world problem and apply modelling methodologies to develop a discrete-event simulation model
CO3	Recognize the cost/benefits of computer simulation, the generation of meaningful results, decision making, and risks
CO4	Interpret and contrast discrete-event techniques for implementing a solution to a simulation problem
CO5	Compare and evaluate alternative system designs using sampling and regression

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	1					1		
CO2	3	3	2	2	2			2				
CO3	2	2	2	3		2						
CO4	3	2	3	2		2						1
CO5	2	2	3		3							

EEP 04 Electrical Engineering Laboratory

No.of Credits:2 No.of Instruction Hours/Week: 4

At least 10 assignments

Electrical Engineering Lab Experiments

CO1	Demonstrate and able to explain electrical components, electrical circuits and Kirchoff's laws.
CO2	Acquire knowledge of DC circuit analysis, DC network theorems and their applications
CO3	Formulate and solve complex AC, DC circuits.
CO4	Understand the principles of operation of DC machines, single phase transformers and three phase induction motors
CO5	Identify the starting methods of starting synchronous and induction motors and speed control methods for DC motors

Course outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1		2								
CO2	2	1	2									
CO3		1		2	2							
CO4			2	2	1	1						
CO5			1	1	2							

CSP 05 DATABASE MANAGEMENT SYSTMES LAB

No.of Credits:2 No.of Instruction Hours/Week:4

At least 20 assignments

SQL queried for tuple calculus
SQL queries for domain calculus
SQL queries for relational algraic operators
Nested SQL queries
Statistical SQL queries MIN, MAX, AVG etc
SQL data ming queries
Xqueries
PL/SQL
Java+SQL

Courseoutcomes:

CO1 Implement the concepts and design database for given information system.

CO2 Develop database programming skills in SQL.

CO3 Design the relational database practically and implement relational algebra expressions for queries

CO4 Design and implement Normalization and design database which possess no anomalies.

CO5 Able to write application programs considering the issues like concurrency control, recovery and security.

CO6 Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										3
CO2		1	2	2	3							3
CO3	3	2		3	3							

CO4	3		3	3	2	2	2		3			
CO5		3	2		3			2				

CSP 06 SIMULATION MODELLING AND PYTHON PROGRAMMING LAB

No. of Credits:2 No. of Instruction Hours/Week: 4

At least 20 assignments may be given

Inventory Systems
Queuing Systems
Random number generation
Random variable generator
Job group scheduling
CPU Scheduling
Problems from numerical methods
Problems from optimization techniques.
XML with Python
OOP with Python

Course outcomes

CO1 Design and implement a program to solve a real world problem.

CO2 Design and implement GUI application and how to handle exceptions and files

CO3 Make database connectivity in python programming language.

CO4 Designing Analyzing a real world problem and apply modelling methodologies to develop a discrete-event simulation model

CO5 Recognize the cost/benefits of computer simulation, the generation of meaningful results, decision making, and risks

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2			3	1		2					
CO2	3	3			3					1		
CO3	2	3	2	3			1					
CO4	3			2								
CO5		2	3		2							

V SEMESTER

CST 09 THEORY OF COMPUTATION

No. of Credits: 4 Instruction Hours / Week: 4

UNIT I

ReviewofBasicMathematicalObjects: Sets, Logic, FunctionRelations, Languages.
Review of Mathematical Induction and Recursive Definitions: Proofs, Mathematical Induction, Recursive Definitions, Structural Induction.
Regular Expressions and Finite Automata: Regular languages, Regular expressions, Memory requirement for language recognition, Finite automata, Distinguishing strings, Unions, Intersections, and Complements.
Finite Automata with Output: Moore machine, Mealy machine, Moore versus Mealy, Transducers as models of sequential circuits.

UNIT II
Nondeterminism and Kleene's Theorem: Nondeterministic finite automata (NFA), NFA with Λ-transitions, Kleene's theorem.
Regular and Nonregular Languages: A criterion for regularity, Minimal finite automata, Pumping lemma for regular languages, Decision problems, Regular languages versus programming languages.

UNIT III
Contex-FreeGrammars: Definition, Examples, Regular grammars, Derivation trees and ambiguity, An unambiguous CFG for algebraic expressions, Simplified forms and normal forms.
Pushdown Automata: Definition, Deterministic pushdown automata, Pushdown automata versus context-free grammar, Parsing.

UNIT IV
Context-Free and Non-Context-Free Languages: Pumping lemma for context-free languages, Intersections and Complements of context-free languages, Decision problems involving context-free languages.
Turing Machines: Definition, Examples, Computing a partial function with a Turing machine, Combining Turing machines, Multi-tape Turing machines, Non deterministic Turing machines, Universal Turing machines, Models of computation and the Church-Turing thesis.

UNIT V
Recursively Enumerable Languages: Recursively enumerable and recursive, Enumerating a language, More general grammars, Context-sensitive languages and the Chomsky hierarchy, Not recursively enumerable languages.
Unsolvable Problems: Non-recursive languages and unsolvable problems, Reducing one problem to another – Halting problem, Other unsolvable problems involving Turing machines, Rice's theorem, Post's correspondence problem, Unsolvable problems involving context-free languages.
Computable Functions: Primitive recursive functions, Primitive recursive predicates and some bounded operations, Unbounded minimalization and μ-recursive functions,
Gödel numbering, Computable functions versus μ-recursive functions, Non-numeric functions, and computability.

Text Books:

1. Martin J C, *Introduction to Languages and the Theory of Computation*, 3rd edition, Tata McGraw-Hill, 2003.
2. Hopcroft J E, Motwani R, and Ullman J D, *Introduction to Automata Theory, Languages, and Computation*, 3rd edition, Pearson Education, 2008.

Reference Books:

1. Krithivasan K, *Introduction to Formal Languages, Automata Theory and Computation*, Pearson Education, 2009.
2. Rich E, *Automata, Computability, and Complexity – Theory and Applications*, Pearson Education, 2012.
3. Singh A, *Elements of Computation Theory*, Springer, 2009.
4. Cohen D I A, *Introduction to Computer Theory*, 2nd edition, John Wiley, 2000.
5. Lewis H, Papadimitriou C H, *Elements of the Theory of Computation*, 2nd edition, Prentice Hall, 1997.

Course outcomes

CO1 Write a formal notation for strings, languages and machines.

CO2 Design finite automata to accept a set of strings of a language.

CO3 For a given language determine whether the given language is regular or not.

CO4 Design context free grammars to generate strings of context free language.

CO5 Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										3
CO2		1	2	2	3							3
CO3	3	2		3	3							
CO4	3		3	3	2	2	2		3			
CO5		3	2		3			2				

CST10 UNIFIED MODELLING LANGUAGE

No. of Credits: 2 Instruction Hours / Week: 2

UNIT-I

UML Overview-UMl history, Goals of UML, Complexity of UML, UML assessment, UML concept areas

Nature and Purpose of Models-What is a model, What are the models for, levels of models, What is in model, what does a model means.

UNIT-II

UML walkthrough- UML views, static views, Use case view, Static machine view, Activity view, intersection view, Deployment view, Model management view,

Static view- Classifier, relationships, association, Generalization, Realization, Dependency, Constraint, Instance.

UNIT-III

Design view-Structured classifier, classification, patterns, and component.

User case view-actors, use case.

Static machne view-Machines, event, state, transition, composite state.

UNIT-IV

Activity view- Activity, activity and other views, action.
Interaction view- Interaction, sequence diagram, communication diagram,.
Deployment view- Node, artifact.

UNIT-V

Model management view-Package, dependency on packages, visibility, import, model.
Profiles- Stereotype, tagged value, profile.
UML environment- Semantics responsibilities, notation responsibilities, Programming Language responsibilities, modeling with tools.

Text Books:

1. James Rinbaugh, Ivar Jacobson, Grady Booch, Unified Modelling Language, Reference Manual, Addison-Wesley, New Yark.
2. Grady Booch, James Rumbaugh and Ivar Jacobson. The Unified Modeling Language User Guide, Addison –Wesly ,1999.

Reference Books

1. Timothy C. Lethbridge and Robert laganiere, Object-Oriented Software Engineering Practical software development using UML and JAVA International Edition, McGraw-hill Education Asia 2002.
2. Grady Booch ,Robert A. Maksimchuk, Object-Oriented Analysis and Design with Applications (3rd Edition) 3rd Edition , 2007.
3. P.Venkata Subba Reddy, Object-Oriented Programming through Java, SCITECH, 2007.

Courseoutcomes:

CO1 Select the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDLC.

CO2 Apply basic and Advanced Structural Modeling Concepts for designing real time applications.

CO3 Design Class and Object Diagrams that represent Static Aspects of a Software System.

CO4 Analyze Dynamic Aspects of a Software System using Use Case, Interaction and Activity Diagrams.

CO5 Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1						1
CO2	3	3	3	2		1	1					
CO3	3	3	3	2								
CO4	3	3	2	1		2	1					2
CO5	3	3	3	2		2	1	2	3	3	3	2

CST11 OPERATING SYSTEMS

No. of Credits: 3 Instruction Hours / Week: 3

UNIT I

Introduction: Definition of operating system, User view, System view, Computer system organization, Computer system architecture, Operating system structure, Operating system operations, Process management, Memory management, Storage management, Protection and security, Distributed systems, Special purpose systems, Computing environments.
System Structures: Operating system services, User – Operating system interface, System calls, Types of system calls, System programs, Operating system design and implementation, Structure, Implementation, System generation, System boot.

UNIT II
ProcessConcept: Process scheduling, Operations on processes, Interprocess communication, Communication in client server systems.
MultithreadedProgramming: Multitheading models, Thread libraries, Threading issues, Examples.
ProcessScheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Thread scheduling, Examples.
Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosophers problem, Readers and writers problem.

UNIT III
Memory-ManagementStrategies: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation, Examples.
VirtualMemoryManagement: Introduction, Demand paging, Copy-on-write, Page replacement, Frame allocation, Thrashing, Memory-mapped files, Kernel memory allocation, Examples.

UNIT IV
Deadlocks: Resources, Conditions for resource deadlocks, Ostrich algorithm, Deadlock detection and recovery, Deadlock avoidance, Deadlock prevention.
FileSystems: Files, Directories, File system implementation, management and optimization.
Secondary-StorageStructure: Overview of disk structure, and attachment, Disk scheduling, RAID structure, Stable storage implementation.

UNIT V
System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.
System Security: Introduction, Program threats, System and network threats, Cryptography for security, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer security classification.
CaseStudies: Linux, Microsoft Windows XP, and Vista.Text Books:
1. Silberschatz A, Galvin P B, and Gagne G, *Operating System Concepts*, 8th edition, Wiley, 2009.
2. Tanenbaum A S, *Modern Operating Systems*, 3rd edition, Pearson Education, 2008. (for Interprocess Communication, File systems, and Case studies)

Reference Books:
1. Tanenbaum A S, Woodhull A S, *Operating Systems Design and Implementation*, 3rd edition, PHI, 2006.
2. Dhamdhere D M, *Operating Systems – A Concept-Based Approach*, 3rd edition, Tata McGraw-Hill, 2012.
3. Stallings W, *Operating Systems – Internals and Design Principles*, 6th edition, Pearson Education, 2009.
4. Nutt G, *Operating Systems*, 3rd edition, Pearson Education, 2004.

Courseoutcomes

CO1 Create processes and threads.

CO2 Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.

CO3 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.

CO4 Design and implement file management system.

CO5 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.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	3	-	-	3	-	-	-	1
CO2	3	3	2	-	-	2	-	-	2	-	1	-
CO3	3	3	1	-	3	-	-	-	3	-	-	-
CO4	3	3	3	3	3	-	-	-	3	-	-	-
CO5	3	3	-	-	3	-	-	-	3	-	-	-

CST12 COMPUTER NETWORKS

No. of Credits: 4 Instruction Hours / Week: 4

UNIT I

Computer Networks and the Internet: A services description, Access networks, Circuit Switching and Packet Switching, ISPs and Internet backbones, Delay, Loss, and throughput in Packet-Switched Networks, Protocol layers and their service models, Security threats, History of computer networking and the Internet, Recent developments.

Application Layer: Network application architectures, Application-layer protocols, The Web and HTTP, Non-persistent and Persistent connections, Cookies, Web caching, FTP, Electronic mail, SMTP, Mail message formats, Mail access protocols, DNS, DNS services, DNS operation, DNS records and messages.

UNIT II

Peer-to-Peer applications, P2P file distribution, Distributed Hash Tables (DHTs), P2P Internet telephony with Skype, Socket programming with TCP, Socket programming with UDP.

TransportLayer: Transport-layer services, Multiplexing and Demultiplexing, Connectionless transport - UDP, UDP Segment structure and Checksum, Reliable data transfer - principles and protocols, Go-Back-N (GBN), Selective Repeat (SR), Connection-oriented transport - TCP, The TCP segment structure, Round-trip time estimation and timeout, Reliable data transfer, Flow control, TCP connection management, Principles of Congestion control, Causes and the costs of Congestion,

Approaches to Congestion control, ATM ABR Congestion control, TCP Congestion control, Fairness.

UNIT III

The Network Layer: Forwarding and Routing, Network service models, Virtual-circuit networks, Datagram networks, Architecture of a Router, Input ports, Switching fabric, Output ports, Queuing, The Internet Protocol (IP), Datagram format, IPv4 addressing, Internet Control Message Protocol (ICMP), IPv6, IP Security, The Link-State (LS) routing algorithm, The Distance-Vector (DV) routing algorithm, Hierarchical routing, Intra-AS routing in the Internet: RIP and OSPF, Inter-AS Routing: BGP, Broadcast routing algorithms, Multicast algorithms.

The Link Layer and LANs: Link layer services, Review of Error-Detection and - Correction Techniques, Multiple access protocols, Channel partitioning protocols, Random access protocols, Taking-turns protocols, Local Area Networks (LANs), Link-layer addressing, MAC addresses, Address Resolution Protocol (ARP), Ethernet, Ethernet frame structure, CSMA/CD: Ethernet's Multiple Access protocol, Ethernet technologies, Link-layer switches, Forwarding and Filtering, Self-learning, Properties of Link-Layer switching, Switches Versus Routers, Virtual Local Area Networks (VLANs), The Point-to-Point Protocol (PPP), PPP Data framing, Link virtualization.

UNIT IV

Wireless and Mobile Networks: Wireless links and Network characteristics, WiFi: 802.11 Wireless LANs, The 802.11 Architecture, The 802.11 MAC protocol, The IEEE 802.11 Frame, Mobility in the same IP subnet, Introduction to Bluetooth and WiMAX, Cellular Internet access, Overview of Cellular architecture, Mobility Management - Principles, Addressing, Routing to a Mobile Node, Mobile IP, Routing calls to a mobile user, Handoffs in GSM, Wireless and Mobility - Impact on Higher-layer Protocols.

Multimedia Networking: Multimedia networking applications, Quality of Service (QoS), Present limitations and Solutions, Audio and Video Compression, Streaming Stored audio and video, Real-Time Streaming Protocol (RTSP), Making the best of the Best-Effort Service, Limitations of Best-Effort Service, Removing Jitter, Recovering from Packet Loss, Distributing Multimedia - Content Distribution Networks, Dimensioning Best-Effort Networks to Provide Quality of Service, Protocols for Real-Time interactive applications, RTP, RTP Control Protocol (RTCP), SIP, H.323, Providing Multiple Classes of Service, Scheduling and Policing Mechanisms, Diffserv, Providing Quality of Service Guarantees, Resource Reservation, Call Admission, Call Setup, Guaranteed QoS in the Internet - Intserv and RSVP.

UNIT V

Security in Computer Networks: Network Security, Secure E-mail, PGP, Securing TCP connections - SSL, Network-Layer Security - IPsec and Virtual Private Networks (VPNs), AH and ESP Protocols, Security Associations, IPsec Datagram, IKE: Key Management in IPsec, Securing Wireless LANs, Wired Equivalent Privacy (WEP), IEEE802.11i, Operational Security - Firewalls and Intrusion Detection Systems.

Network Management: Introduction to Network Management, Infrastructure for network management, The Internet-Standard Management Framework, Structure of Management Information (SMI), Management Information Base (MIB), SNMP protocol operations and transport mappings, Security and Administration, ASN.l.

Text Book:

1. Kurose J F, Ross K W, *Computer Networking – A Top-Down Approach*, 5th edition, Pearson Education, 2010.

Reference Books:

1. Tanenbaum A S, Wetherall D J, *Computer Networks*, 5th edition, Pearson Education, 2011.
2. Peterson L L, Davie B S, *Computer Networks - A Systems Approach*, 5th edition, Morgan Kaufmann, 2011.
3. Forouzan B A, Mosharraf F, *Computer Networks – A Top-Down Approach*, Tata McGraw-Hill, 2012.
4. Olifer N, Olifer V, *Computer Networks – Principles, Technologies, and Protocols for Network Design*, Wiley, 2006.

Courseoutcomes:

CO1 Apply the concepts of data Communication in real world.

CO2 Analyze functionalities of OSI Layers.

CO3 Compare and contrast various transmission media, flow Control and error detection & correction techniques.

CO4 Evaluate the routing algorithms & transport protocols for achieving efficiency in societal and real world applications

CO5 Analyze networking & application protocols with the help of simulation tools.

CO6 Evaluate the various security Mechanisms in real world applications.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	1	-	-	-	-	1
CO2	3	3	-	-	-	2	-	-	2	-	-	-
CO3	3	3	-	-	3	-	-	-	3	-	-	-
CO4	2	3	2	3	3	-	2	-	3	-	-	-
CO5	3	2	-	-	3	-	-	-	1	-	-	-
Co6	3	3	2	3	3	-	-	-	3	-	-	-

CST13 PRINCIPLES OF PROGRAMMING LANGUAGES

No. of Credits: 3 Instruction Hours / Week: 3

UNIT I

Preliminaries: Programming domains, Language evaluation criteria, Influences on language design, Language categories, Language design trade-offs, Implementation methods, Programming environments.

Evolution of Major Programming Languages: Pseudocodes, Fortran, Lisp, ALGOL60, COBOL, BASIC, PL/I, APL, SNOBOL, SIMULA 67, ALGOL 68, Prolog, Ada, Smalltalk, C++, Java, Scripting Languages, C#, Hybrid languages.

Describing Syntax and Semantics: Formal methods of describing syntax, Attribute grammars, Dynamic semantics.
Introduction to Lexical and Syntax Analysis: Lexical analysis, Syntax analysis – Top-down and Bottom-up parsing.

UNIT II
Names, Bindings, and Scopes: Names, Variables, Concept of binding, Scope, Scope and lifetime, Referencing environments, Named constants.
Data Types: Primitive data types, Character string types, User-defined ordinal types, Array types, Associative arrays, Record types, Tuple types, List types, Union types, Pointer and reference types, Type checking, Strong typing, Type equivalence.
Expressions and Assignment Statements: Arithmetic expressions, Overloaded operators, Type conversions, Relational and Boolean expressions, Short-circuit evaluation, Assignment statements, Mixed-mode assignment.

UNIT III
Statement-Level Control Structures: Selection statements, Iterative statements, Unconditional branching, Guarded commands.
Subprograms: Fundamentals, Design issues, Local referencing environments, Parameter-passing methods, Parameters that are subprograms, Overloaded subprograms, Generic subprograms, Design issues for functions, User-defined overloaded operators, Coroutines.
Implementing Subprograms: General semantics of calls and returns, Implementing simple subprograms, Implementing subprograms with stack-dynamic local variables, Nested subprograms, Blocks, Implementing dynamic scoping, Implementing parameters that are subprogram names.

UNIT IV
Abstract Data Types and Encapsulation Constructs: Concept of abstraction, Data abstraction, Design issues for abstract data types, Language examples, Parameterized abstract data types, Encapsulation constructs, Naming encapsulations.
Support for Object-Oriented Programming: Object-oriented programming, Design issues for object-oriented languages, Support for object-oriented programming in – Smalltalk, C++, Java, C#, Ada95, Ruby; Object model of JavaScript, Implementation of object-oriented constructs.
Concurrency: Subprogram-level concurrency, Semaphores, Monitors, Message passing, Concurrency in Ada 95, Java threads, C# threads, Concurrency in functional languages, Statement-level concurrency.

UNIT V
Exception Handling and Event Handling: Introduction to exception handling, Exception handling in - Ada, C++, Java; Introduction to event handling, Event handling in Java, and C#.

Functional Programming Languages: Mathematical functions, Fundamentals of functional programming languages, Introduction to – LISP, Scheme, ML, Haskell, F#; Applications of functional languages, Comparison of functional and imperative languages.
Logic Programming Languages: Introduction to predicate calculus, Predicate calculus and proving theorems, Overview of logic programming, Origins of prolog, Basic elements of prolog, Deficiencies of prolog, Applications of Logic Programming.

Text Book:
Sebesta R W, *Concepts of Programming Languages*, 10th Edition, Addison-Wesley, 2013.

Reference Books:
1. Louden K C, Lambert K, *Programming Languages – Principles and Practice*, 3nd Edition, Course Technology,2011.

2. Tucker A B, Noonan R E, *Programming Languages – Principles and Paradigms*, 2nd Edition, Tata McGraw-Hill, 2007.
3. Pratt T W, Zelkowitz M V, and Gopal T V, *Programming Languages – Design and Implementation*, 4th Edition, Pearson Education, 2006.
4. Ghezzi C, Jazayeri M, *Programming Language Concepts*, 3rd Edition, Wiley, 1998.
5. Scott M L, *Programming Language Pragmatics*, 3rd edition, Morgan Kaufmann, 2009.
6. Friedman D P, Wand M, *Essentials of Programming Languages*, 3rd edition, MIT, 2008.
7. Gabbrielli M, Martini S, *Programming Languages: Principles and Paradigms*, Springer, 2012.
8. Dowek G, Levy J J, *Introduction to the Theory of Programming Languages*, Springer, 2011.

Courseoutcomes:

CO1:Describe syntax and semantics of programming languages
CO2: Analyze the design issues involved in various constructs of programming languages
CO3: 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

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		2					1			2
CO2	2	3	3			2			2			
CO3		2	3		2			1				
CO4	3	3		2			2				1	
CO5	2	3	3			2			1			

CST14- SOFTWARE ENGINEERING

No. of Credits: 3 Instruction Hours / Week: 3

UNIT I

Software and Software Engineering: Nature of software, Unique nature of WebApps, Software engineering, The software process, Software engineering practice, Software myths.

Process Models: A generic process model, Process assessment and improvement, Prescriptive process models - Waterfall model, Incremental process models, Evolutionary process models, Concurrent models; Specialized process models - Component-based development, The formal methods model, Aspect-oriented software development; The unified process, Personal and Team process models, Product and process.

UNIT II

Agile Development: Concept of agility, Agility and cost of change, The agile process, Agility principles, Extreme programming (XP), The XP process, The XP debate, Other agile process models - Adaptive software development, Scrum, Dynamic systems development method, Crystal, Feature driven development, Lean software development, Agile modeling, Agile unified process; A tool set for the agile process.

Principles that Guide Practice: Software engineering knowledge, Core principles, Principles that guide each framework activity - Communication principles, Planning principles, Modeling principles, Construction principles, Deployment principles.

Understanding Requirements: Requirements engineering, Establishing the groundwork, Eliciting requirements, - Collaborative requirements gathering, Quality function deployment, Usage scenarios,

Elicitation work products; Developing use cases, Building the requirements model, Negotiating and validating requirements.

UNIT III

RequirementsModeling:Scenarios,Information,andAnalysisClasses: Requirements analysis, Overall objective and philosophy, Requirements modeling approaches, Scenario-based modeling, UML Use Case, Activity diagram, Swimlane diagrams, Data modeling concepts, Class-based modeling, Class-responsibility-collaborator modeling.

Requirements Modeling: Flow, Behavior, Patterns, and WebApps: Requirements modeling strategies, Flow-oriented modeling, Creating a behavioral model, Patterns for requirements modeling, Requirements modeling for WebApps.

UNIT IV

Design Concepts: Design within the context of software engineering, The design process, Design concepts – Abstraction, Patterns, Modularity, Information hiding, Functional independence, Refinement, Refactoring, Object-oriented design concepts; The design model.- Data design, Architectural design, Interface design, Component-level design, Deployment-level design.

Architectural Design: Software architecture, Architectural genres, Architectural style, Architectural design, Assessing alternate architectural designs, Architectural complexity, Architectural mapping using data flow.

Component-level Design: Concept of a component, Designing class based components, Conducting component-level design, Component-level design of WebApps, Designing traditional components, Component-based development.

UNIT V

User Iinterface Design: The golden rules, User interface analysis and design, Interface analysis, Interface design steps, WebApp interface design.

Pattern-based Design: Design patterns, Pattern-based software design, Architectural patterns, Component- level design patterns, User interface design patterns, WebApps design patterns.

Webapp Design: WebApps design quality, Design goals, A design pyramid for WebApps, WebApps interface design, Aesthetic design, Content design, Architecture design, Navigation design, Component-level design, Object oriented hypermedia design method.

Text Book:

Pressman R S, *Software Engineering: A Practitioner's Approach*, 7th edition, McGraw-Hill, 2010. (Chapters 1 to 13)

COURSE OUTCOMES:

CO1 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

CO2 Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project

CO3 Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.

CO4 Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice

CO5 Able to use modern engineering tools necessary for software project management, time management and software reuse.

Reference Books:

1. Sommerville I, *Software Engineering*, 9th edition, Pearson Education, 2011.
2. Jalote P, *Software Engineering: A Precise Approach*, Wiley, 2010.
3. Braude E J, Bernstein M E, *Software Engineering: Modern Approaches*, 2nd edition, Wiley, 2010.
4. Ghezzi C, Jazayeri M, Mandrioli D, *Fundamentals of Software Engineering*, 2nd edition, PHI, 2003.
5. Saleh K A, *Software Engineering*, J Ross Publishing, 2009.
6. Bruegge B, Dutoit A H, *Object-Oriented Software Engineering Using UML, Patterns, and Java*, 3rd edition, Prentice Hall, 2009.
7. Tsui F, Karam O, *Essentials of Software Engineering*, 2nd edition, Jones & Bartlett, 2009.
8. Schmidt M E C, *Implementing the IEEE Software Engineering Standards*, Sams, 2000.
9. Pilone D, Miles R, *Head First Software Development*, O'Reilly (Shroff), 2008.
10. Bennett S, McRobb S, Farmer R, *Object-Oriented System Analysis and Design Using UML*, 4nd edition, McGraw-Hill, 2010.
11. Lethbridge T C, Laganiere R, *Object-Oriented Software Engineering*, 2nd edition, McGraw-Hill, 2005.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2		3	2		1						
CO2	3	2		3			2					1
CO3		3	2		3					2		
CO4	3	2		3				1				
CO5	2		3	2		1				2		

CSP 07 COMPUTER NETWORKS AND PRINCIPLES OF PROGRAMMING LAB

No. of Credits: 2 No. of Instruction Hours/Week: 4

At least 10 Practical assignment shall be given on Computer Networks.

At least 10 Practical assignment shall be given on Principles of Programming .

CO1 Identify and use various networking components Understand different transmission media and design cables for establishing a network

CO2 Implement any topology using network devices

CO3 Understand the TCP/IP configuration for Windows and linux

CO4 Implement device sharing on network

CO5 Learn the major software and hardware technologies used on computer networks

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		2			2			1		
CO2		2	3	2				2				1
CO3	3	2			3		2		1			
CO4		3	2		2		1					

CO5	2	3	1		1							

CSP 08 OPERATING SYSTEMS & UNIFIED MODELLING LANGUAGE LAB

No. of Credits:2 No. of Instruction Hours/Week:4

At least 10 Practical assignment shall be given on Operating Systems.

At least 10 Practical assignment shall be given on Unified Modeling Language

COURSE OUTCOMES

CO1 Creating processes and threads using C/C++/JAVA/Python

CO2 Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time C/C++/JAVA/Python

CO3 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.

CO4 Design and implement file management system C/C++/JAVA/Python

CO5 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.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3		2				1				
CO2		2	3	2		1			2			
CO3	3	3		2	1					1		
CO4		2	2		3		1					
CO5	2	2		3		2						

VI- SEMESTER

Instructional Open Elective

CST15 ARTIFICIAL NEURAL NETWORKS

No. of Credits: 4 Instruction Hours / Week: 4

UNIT-I

Introduction - Trends in computing, Pattern and data, Pattern recognition methods.
Basics of Artificial Neural Networks - Characteristics of neural networks, Historical development, Terminology, Models of neuron, Topology, Basic learning laws.
Activation and Synaptic Dynamics - Activation dynamics models, Synaptic dynamics models,

Learning methods, Stability and Convergence, Recall in neural networks.

UNIT-II

Functional Units of ANNs for Pattern Recognition Tasks - Pattern recognition problem, Basic types of ANNs, Various pattern recognition tasks performed by ANNs.

Feed-forward Neural Networks - Analysis of - Pattern associative networks, Pattern classification networks, Pattern mapping networks.

UNIT-III

Feed-back Neural Networks - Linear auto associative FF networks, Pattern storage networks, Stochastic networks, and Simulated annealing; Boltzmann machine.

UNIT-IV

Competitive Learning Neural Networks - Components of a competitive learning neural network, Analysis of feedback layer for different output functions, Analysis of pattern clustering networks, Analysis of feature mapping networks.

Architecture for Complex Pattern Recognition Tasks - Associative memory, Pattern mapping, Stability-Plasticity dilemma, Adaptive resonance theory, Temporal patterns, Pattern variability – Neocognitron.

UNIT-V

Applications of ANNs - Pattern classification – character recognition, Associative memories – content addressable memory, Information retrieval; Optimization – Linear programming problem, Traveling salesman problem, Smoothing images with discontinuities; Vector quantization, Control applications, Applications in speech, image processing and decision making.

Text Books

1. Yegnanarayana B, *Artificial Neural Networks*, Prentice-Hall of India Pvt. Ltd., 2009.
2. Satish Kumar, *Neural Networks: A Class Room Approach*, Tata McGraw-Hill Publishing Company Ltd., 2004.

Reference Books

1. Haykin S, *Neural Networks: A Comprehensive Foundation*, 2nd edition, Pearson Education Asia, 1999.
2. Bishop C M, *Neural Networks for Pattern Recognition*, Oxford University Press, 1995.
3. Hagan M T, Demuth H B, and Beale M, Neural Network Design, Thomson Learning, 1996.

COURSE OUTCOMES

CO1	Introduction to Neural Networks
CO2	Essentials of Artificial Neural Networks
CO3	Multilayer feed forward Neural Networks
CO4	Architecture of Hopfield Network
CO5	Fuzzy Logic System Components

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3		2				1				
CO2		2	3	2		1			2			
CO3	3	3		2	1					1		
CO4		2	2		3		1					
CO5	2	2		3		2						

CST16 **DESIGN AND ANALYSIS OF ALGORITHMS**

No. of Credits: 4 Instruction Hours / Week: 4

UNIT I

Introduction: Notion of algorithm, Fundamentals of algorithmic problem solving, Important problem types – sorting, searching, string processing, graph problems, combinatorial problems, geometric problems, numerical problems.
Fundamentals of the Analysis of Algorithm Efficiency: Analysis framework, Asymptotic notations and basic efficiency classes, Mathematical analysis of recursive and non-recursive algorithms, Example-fibonacci numbers, Empirical analysis of algorithms, Algorithms visualization.

UNIT II

Brute Force Methods: Selection sort and bubble sort, Sequential search and brute-force string matching, Closest-pair and convex-hull problems by brute force, Exhaustive search.
Divide-and-Conquer: Mergesort, Quicksort, Binary search, Binary tree traversals, Multiplication of large integers, Strassen's matrix multiplication, Closest-pair and convex-hull problems by divide-and-conquer.
Decrease-and-Conquer: Depth-first search and breadth-first search, Topological sorting, Algorithms for generating combinatorial objects, Decrease-by-a-constant-factor algorithms, Variable-size-decrease algorithms.

UNIT III

Transform-and-Conquer: Presorting, Gaussian elimination, Balanced search trees, Heaps and heapsort, Horner's rule, and binary exponentiation, Problem reduction.
SpaceandTimeTradeoffs: Sorting by counting, Input enhancement in string matching, Hashing, B-trees.
DynamicProgramming: Computing a binomial coefficient, Warshall's and Floyd's algorithms, Optimal binary search trees, Knapsack problem and memory functions.

UNIT IV

GreedyTechnique: Prim's Algorithm, Kruskal's algorithm, Dijkstra's algorithm, Huffman trees.
LimitationsofAlgorithmPower: Lower bound arguments, Decision trees, P, NP, and NP-complete problems, Challenges of numerical algorithms.
CopingwiththeLimitationsofAlgorithmPower: Backtracking, Branch-and-bound, Approximation algorithms for NP-hard problems, Algorithms for solving nonlinear equations.

UNIT V

Introduction to Parallel Algorithms and Architectures: Design of parallel algorithms, Architecture constraints, Computing dot product on EREW PRAM versus the 2-dimensional mesh, Pseudocode conventions for PRAMs and interconnection network models, Performance measures of parallel algorithms.
ParallelSorting: Sorting on CRCW and CREW PRAMS, Odd-even merge sort on EREW PRAM, Sorting on one and two dimensional meshes, Sorting networks.

Text Books:

1. Levitin A, *Introduction to the Design and Analysis of Algorithms*, Pearson Education, 2003. (for UNITS I to IV)

2. Berman K A, and Paul J L, *Fundamentals of Sequential and Parallel Algorithms*, Thomson Brook/Cole, 1997. (Chapters 5 and 6, for UNIT V)

Reference Books:

1. Cormen T H, Leiserson C E, Rivest R L, and Stein C, *Introduction to Algorithms*, 3rd edition, Prentice-Hall of India, 2009.
2. Horowitz E, Sahni S, and Rajasekaran S, *Fundamentals of Computer Algorithms*, 2nd edition, Universities Press, 2007.
3. Goodrich M T, Tamassia R, *Algorithm Design*, Wiley, 2006.
4. Skiena S S, *The Algorithm Design Manual*, 2nd edition, Springer, 2008.
5. Heineman G T, Pollice G, Selkow S, *Algorithms in a Nutshell*, O'Reilly (Shroff), 2009.
6. Dave P H, and Dave H B, *Design and Analysis of Algorithms*, Pearson Education, 2008.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3	3			2			3	2
CO2	2	2	3	2	1		2	3				2
CO3	1	3	2	3	3		3	3			1	2
CO4	2	2	2	3	1	2	2					1
CO5						2						

CST17 SYSTEMS PROGRAMMING

No. of Credits: 3 Instruction Hours / Week: 3

UNIT I

Background: Introduction, System software and machine architecture, SIC, CISC, RISC architectures. Assemblers: Basic assembler functions – A simple SIC assembler, Assembler algorithm and Data structures; Machine-dependent assembler features – Instruction formats and addressing modes, Program relocation; Machine independent assembler features – Literals, Symbol defining statements, Expressions, Program blocks, Control sections and program linking; Assembler design options – One-pass Assemblers, Multi-pass assemblers; Implementation examples – MASM assembler, SPARC assembler, GNU as assembler.

UNIT II

Loaders and Linkers: Basic loader functions – Design of an absolute loader, Simple bootstrap loader; Machine dependent loader features – Relocation, Program linking, Algorithm and data structures for a linking loader; Machine independent loader features – Automatic library search, Loader options; Loader design options - Linkage editor, Dynamic linking, Bootstrap loaders; Implementation examples – MS-DOS linker, SunOS linkers, Cray MPP linker, GNU ld linker.

UNIT III

Macro Processors: Basic macro processor functions – Macro definition and expansion, Macro processor algorithm and data structures; Machine independent macro processor features – Concatenation of macro parameters, Generation of unique labels, Conditional macro expansion, Keyword macro parameters; Macro processor design options – Recursive macro expansion, General purpose macro processors, Macro processing within language translators; Implementation examples – MASM macro processor, ANSI C macro language, GNU m4 macro processor.

Other System Software: Text editors - Editing process, User interface, Editor structure; Interactive

debugging systems – Debugging functions and capabilities, User interface criteria; Integrated development environments – Eclipse IDE Architecture, the core, Parser and lexer, Error recovery, User interface, Basic editor framework, Source viewer configuration, Syntax highlighting, Reconciler.

UNIT IV

Linux Kernel: Overview of kernel, Loadable modules, Timers, Concurrency, Memory allocation, kernel threads, Helper interfaces, Devices and drivers, Interrupt handling, Linux device model.

CharacterDrivers: Char Driver Basics, Device Example - System CMOS, Sensing data availability, Talking to the parallel port, RTC subsystem, Pseudo char drivers

SerialDrivers: Layered architecture, UART Drivers, TTY Drivers.

InputDrivers: Input event drivers, Input device drivers.**UNIT V**

UniversalSerialBus: USB architecture, Linux-USB subsystem, Driver data structures, Device example - Telemetry card.

BlockDrivers: Storage technologies, Linux block I/O layer, I/O schedulers, Block driver data structures and methods, Device example - Simple storage controller.

DriversinUserSpace: Process scheduling and response times, Accessing I/O regions, Accessing memory regions, User mode SCSI, User mode USB.

Text Books:

1. Beck L L, *System Software: An introduction to Systems Programming*, 3rd Edition, Pearson Education, 1997.
2. Venkateswaran S, *Essential Linux Device Drivers*, Pearson Education, 2008.

Reference Books:

1. Dhamdhere D M, *System Programming*, Tata McGraw-Hill, 2011.
2. Corbet J, Hartman G K, and Rubini A, *Linux Device Drivers*, 3rd Edition, O'Reilly, 2005.
3. Kong J, *Free BSD Device Drivers*, No Starch Press, 2012.
4. Orwick P, Smith G, *Developing Drivers with the Windows Driver Foundation*, Microsoft Press, 2007.
5. Levin J R, *Linkers and Loaders*, Morgan Kaufmann, 1999.
6. Rosenberg J B, *How Debuggers Work: Algorithms, Data Structures and Architecture*, Wiley, 1996.

Web Documents:(for IDE development)

1. http://www.ibm.com/developerworks/opensource/tutorials/os-ecl-commplgin1/os-ecl-commplgin1-pdf.pdf
2. http://www.ibm.com/developerworks/opensource/tutorials/os-ecl-commplgin2/os-ecl-commplgin2-pdf.pdf

CO1	To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger
CO2	Describe the various concepts of assemblers and macro processors.
CO3	To understand the various phases of compiler and compare its working with assembler.
CO4	To understand how linker and loader create an executable program from an object module created by assembler and compiler.
CO5	To know various editors and debugging techniques.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3	3			2			3	2
CO2	2	2	3	2	1		2	3				2
CO3	1	3	2	3	3		3	3			1	2
CO4	2	2	2	3	1	2	2					1
CO5						2						

CST18 MICROPROCESSORS AND INTERFACING

No. of Credits: 4 Instruction Hours / Week: 4

UNIT I

Featuresof8086Processor: Brief history, Architecture, Pin diagram, Signal description, Timing diagrams.

Programming8086: Programmer's view of 8086, Instruction set, Instruction format, Addressing modes, Intel and AT&T assembly language conventions, Assembly directives.

SpecialArchitecturalFeaturesof8086: Stack structure and operations, Interrupts and Interrupt handling, DMA and DMA handling, Parameter passing, Handling large programs, MACROS.

UNIT II

BasicSystemConfiguration: Minimum and Maximum modes, 8284 clock generator, 8288 Bus controller, Latches, Buffers, and Transceivers.

PeripheralsandTheirInterfacing: Memory and I/O address space, Address decoding schemes, Static and Dynamic memory interfacing, Simple I/O interfacing, Interfacing A/D and D/A converters.

UNIT III

Programmable Peripheral Devices and Their Interfacing: Interfacing Programmable Peripheral Interface (8255), Programmable Interval Timer (8253), USART (8251), Programmable Interrupt Controller (8259A), Programmable DMA Interface (8237), Keyboard and Display Controller (8279), CRT Controller (MC6845).

UNIT IV

8086 Microprocessor-Based Development System: Introduction, Basic operations, Block diagram of the hardware, Software monitor, Interfacing add-on boards.

Multi-microprocessor Systems: Interconnection topologies, Software aspects, Numeric Processor (8087), I/O Processor (8089), Bus arbitration and control, Tightly coupled and loosely coupled systems.

IntroductiontoAdvancedProcessors: Features of Intel Pentium, and Core2 Processors.

UNIT V

8051 Microcontroller: Architecture, Pin diagram, Signal description, Programmers view, Instruction set, Memory and I/O addressing, Microcontroller based system development.

80196Microcontroller: Architecture, Important features.

Text Book:

1. Ray A K, Bhurchandi K M, *Advanced Microprocessors and Peripherals*, 2nd Edition, Tata McGraw-Hill, 2006.
2. Mazidi M A, Mazidi J G, McKinlay R, Das L B, *Microprocessors and Microcontrollers*, Pearson Education,2012.

Reference Books:

1. Manohar G T, *Advanced Microprocessors*, Pearson Education, 2010.
2. Hall D V, Rao S S S P, *Microprocessors and Interfacing*, 3rd Edition, Tata McGraw-Hill, 2012.
3. *80196 Microcontroller Family User Manual*, INTEL, 1995.
4. *8086 Microprocessor Trainer Kit User and Technical Manuals*, VI Micro Systems, Chennai.

COURSE OUTCOMES:

CO1	Understand the taxonomy of microprocessors and knowledge of contemporary microprocessors.
CO2	Describe the architecture, bus structure and memory organization of 8085 as well as higher order microprocessors.
CO3	Explore techniques for interfacing I/O devices to the microprocessor 8085 including several specific standard I/O devices such as 8251 and 8255.
CO4	Demonstrate programming using the various addressing modes and instruction set of 8085 microprocessor
CO5	Design structured, well commented , understandable assembly language programs to provide solutions to real world control problems

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		3	3	1		2		2			1	
CO2	2	2		2		3		2		1		2
CO3	2	3		2	2		1		3		1	
CO4	3	2			3		2		1		3	
CO5	3	2			2			1			2	

CST19 SOFTWARE PROJECT MANAGEMENT

No. of Credits: 3 Instruction Hours / Week: 3

UNIT I

ProjectManagementConcepts: The management spectrum – People, The product, The process, The project; The W^5HH principle, Critical Practices.
ProcessandProjectMetrics: Introduction, Software measurement, Software quality metrics, Integrating metrics within the software process, Metrics for small organizations.

UNIT II

EstimationforSoftwareProjects: Introduction, Project planning process, Software scope and feasibility, Resources, Software project estimation, Decomposition techniques, Empirical estimation models, Estimation for object-oriented projects, Specialized estimation techniques, The make/buy decision.

UNIT III

ProjectScheduling: Basic concepts, Principles, Defining a task set for software project, Defining a task network, Scheduling, Earned value analysis.
RiskManagement: Reactive versus proactive risk strategies, Software risks, Risk identification, Risk projection, Risk refinement, Risk mitigation, monitoring and management, RMMM plan.

UNIT IV

MaintenanceandReengineering: Software maintenance, Software supportability, Reengineering, Business process reengineering, Software reengineering, Reverse engineering, Restructuring, Forward engineering, Economics of reengineering.

SoftwareProcessImprovement(SPI): Introduction, SPI process, CMMI, The people CMMI, Other SPI frameworks, SPI return on investment, SPI trends.

UNIT V

EmergingTrendsinSoftwareEngineering: Technology evolution, Software engineering trends, Identifying soft trends, Technology directions, Tools-related trends.

Text Book:

1. Pressman R S, *Software Engineering - A Practitioner's approach*, 7th Edition McGraw-Hill, 2010. (Quality Management – Chapters 24 to 32)

Reference Books:

1. Jacobson I, Christerson M, Jonsson P, *Object Oriented Software Engineering: A Use Case Driven Approach*, Pearson, 1992.
2. Hughes B, Cotterell M, Mall R, *Software Project Management*, 5th edition, Tata McGrwa Hill, 2011.
3. Royce W, *Software Project Management*, Pearson, 1998.

COURSE OUTCOMES:

CO1	**Understand how to manage projects.**
CO2	**Comp are conventional and modern software engineering principles.**
CO3	**Explain various phases in modern software management**
CO4	**Understand project planning and organization.**
CO5	**Apply software metrics and economics in a project.**

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			1			2						
CO2			2					2				
CO3		2					2					
CO4				1				2		2		
CO5					2			2		2		

CSE01

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
B.Tech (CSE) - VI SEMESTER (CBCS)
(With effect from the academic year 2018 – 19)

Massive Online Open Courses (MOOCS)

No. of Credits: 4 Instruction Hours / Week: 4

Any one of the courses

1. Introduction to Information Security - I,V Kamakoti,IIT Madras

2. Information Security- II,V Kamakoti,IIT Madras

CSP10

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
B.Tech (CSE) - VI SEMESTER (CBCS)

Microprocessors and Interfacing Laboratory

No.of Credits:2 No.of Instruction Hours/Week:4

At least 10 Practical assignments shall be given on microprocessors and Interfaceing.

COURSE OUTCOMES:

CO1 To understand the internal architecture of microprocessors.

CO2 To familiarizes with the assembly level programming

CO3 Knowledge of the 8086 instruction set and ability to utilize it in programming.

CO4 Understanding of the inter 8086 real mode memory addressing

CO5 Understand multi core processor systems and its advantages.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2		3								
CO2	2	3				1						
CO3		2	3		2							
CO4	3		2			2				1		
CO5		3	2	2				1				

CSP11

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
B.Tech (CSE) - VI SEMESTER (CBCS)
(With effect from the academic year 2018 – 19)

Algorithms and Systems Programming Lab

No.of Credits:2 No.of Instruction Hours/Week:4

At least 10 Practical assignments shall be on Algorithms.

At least 10 Practical assignments shall be given on System Programming

COIURSE OUTCOMES:

CO1 Identify the problem given and design the algorithm using various algorithm design techniques.

CO2 Implement various algorithms in a high level language.

CO3 Analyze the performance of various algorithms.

CO4 Compare the performance of different algorithms for same problem.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3			1				2			
CO2		2	3				2				1	
CO3	2	3		2								
CO4		2				1						

CST 12

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
B.Tech (CSE) - VI SEMESTER (CBCS)

Soft Skills Lab

No.of Credits:1 No.of Instruction Hours/Week:2

At least 10 Practical assignments shall be given on Soft skills.

VII SEMESTER

CSE20 **Cyber Law and Ethics**

No. of Credits: 2 Instruction Hours / Week: 2

UNIT I

An Overview of Ethics: Introduction, Morals, Ethics, Laws, Ethics in the business world, Ethics in information technology.

Ethics for IT Workers and IT Users: Nature of IT profession, Professional relationships, Concept of professional code of ethics, Certification, IT professional malpractice, Common ethical issues for IT users, Supporting the ethical practices.

UNIT II

Computer and Internet Crime: IT security incidents, Laws for prosecuting computer attacks, Implementing trustworthy computing,

Privacy: Information privacy, Privacy laws, Key privacy and anonymity issues – Identity theft, Consumer profiling, Workplace monitoring, Advanced surveillance technology.

UNIT III

FreedomofExpression: Free speech issues and laws, Controlling access to information on the Internet, Anonymity on the internet, Defamation and hate speech, Corporate blogging, Pornography.

Intellectual Property: Concept of intellectual property, Copyright, Software copyright protection, International and National agreements and laws, Patents, Trade secrets, Plagiarism, Reverse engineering, Open source code, Competitive intelligence, Trademark infringement, Cyber squatting.

UNIT IV

SoftwareDevelopment: The importance of software quality, Software product liability, Development of safety-critical systems, Quality management standards.

The Impact of IT on Productivity and Quality of Life: IT investment and productivity, The digital divide, The impact of IT on healthcare costs.

UNIT V

SocialNetworking: Introduction, Business applications of online social networking, Ethical issues in social networking, Online virtual worlds.

EthicsofITOrganizations: Key ethical issues for organizations, Outsourcing, Whistle-blowing, Green computing.

CodesofEthics: ACM/IEEE Software engineering code of ethics, IE(India) code of ethics, CSI code of ethics.

GovernmentRegulation: Indian IT act 2000, IT(Amendment act) 2008.

Text Book:

Reynolds G, *Ethics in Information Technology*, 4th edition, Cengage Learning, 2012.

Reference Books:

1. Johnson D G, *Computer Ethics*, 4th edition, Pearson, 2009.
2. Martin M, Schinzinger R, *Introduction to Engineering Ethics*, 2nd edition, McGraw Hill, 2010.
3. Harris Jr. C E, Pritchard M S, Rabins M J, *Engineering Ethics: Concepts and Cases*, 4th edition, Wadsworth, 2008.
4. Govindarajan M, Natarajan S, Senthilkumar V S, *Engineering Ethics*, PHI, 2009.
5. Reddy G B, *Constitution of India & Professional Ethics*, I K International, 2011.

6. Floridi L, *Information and Computer Ethics*, Cambridge University Press, 2010.
7. Balachandran S, Raja K C R, Nair B K, *Ethics, Indian Ethos and Management*, Shroff Publishers, 2008.

COURSE OUTCOMES:

CO1 Make Learner Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace.

CO2 Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace;

CO3 Develop The Understanding Of Relationship Between Commerce And Cyberspace

CO4 Give Learners In Depth Knowledge Of Information Technology Act And Legal Frame Work Of Right To Privacy, Data Security And Data Protection.

CO5 Make Study On Various Case Studies On Real Time Crimes.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2	3		2							
CO2				3								
CO3	2	3					2					
CO4		2	3		2					1		
CO5	2			3		2						

CST 21 ARTIFICIAL INTELLIGENCE

No. of Credits: 3 Instruction Hours / Week: 3

UNIT I

The History of AI: Concept of intelligence, Search for Mechanical Intelligence, Evolution of Artificial Intelligence (AI), Systems Approach, Overview of topics.

Uninformed Search: General state space search, Trees, Graphs and Representation, General Search Paradigms - Depth-First Search, Depth-Limited Search, Iterative Deepening Search, Breadth-First Search, Bi-directional Search, Uniform-Cost Search.

Informed Search: Best-First Search, N-Queens problem, A* Search, Eight Puzzle problem, Hill Climbing Search, Simulated Annealing, Tabu Search, Constraint Satisfaction, Graph Coloring problem, Constraint Satisfaction algorithms - Generate and Test, Backtracking, Forward Checking and Look Ahead, Min-Conflicts Search.

UNIT II

AI and Games: Two Player Games, The Minimax Algorithm, Tic-Tac-Toe problem, Minimax with Alpha-Beta Pruning, Classical Game AI, Checkers, Chess, Scrabble, Video Game AI, Movement and Path finding, Table Lookup with Offensive and Defensive Strategy, NPC Behavior, Team AI, Real-Time Strategy AI.

Knowledge Representation (KR): Types and Role of Knowledge, Semantic Nets, Frames, Propositional Logic, First Order Logic (Predicate Logic), Semantic Web, Computational Knowledge Discovery, Ontology, Common Sense.

UNIT III

Machine Learning: Machine Learning Algorithms, Supervised Learning, Decision Trees, Unsupervised Learning, Markov Models and implementation, Nearest Neighbor Classification, 1NN

and k-NN Examples.
EvolutionaryComputation: Introduction to Evolutionary Computation, Biological Motivation, Genetic Algorithms, Genetic Programming, Evolutionary Strategies, Differential Evolution.

UNIT IV
NeuralNetworksI: Concept of Neural Networks, Biological Motivation, Fundamentals of Neural Networks,
The Perceptron, Least-Mean-Square (LMS) Learning, Learning with Backpropagation, Probabilistic Neural Networks, Tips for Building Neural Networks.
NeuralNetworksII: Unsupervised Learning, Hebbian Learning, Simple Competitive Learning, k-Means Clustering, Adaptive Resonance Theory, Hopfield Auto-Associative Model.

UNIT V
Robotics and AI: Introduction, Taxonomy of Robotics, Hard vs. Soft Robotics, Braitenburg Vehicles, Natural Sensing and Control, Perception with Sensors, Actuation with Effectors, Robotic Control Systems, Simple Control Architectures, Movement Planning, Distributed Robotics.
Intelligent Agents: Anatomy of an Agent, Agent Properties and AI, Hybrid Agent, Agent Architectures, Types of Architectures, Agent Languages, Agent Communication.
Biologically Inspired and Hybrid Models: Cellular Automata, Artificial Immune Systems, Artificial Life, Fuzzy Logic, Evolutionary Neural Networks, Ant Colony Optimization, Affective Computing.

Text Book:

Jones M T, *Artificial Intelligence – A Systems Approach*, Infinity Science Press, 2008.

Reference Books:

1. Russel S, Norvig P, *Artificial Intelligence: A Modern Approach*, 3rd edition, Pearson Education, 2010.
2. Rich E, Knight K, Nair S B, *Artificial Intelligence*, 3rd edition, Tata McGraw-Hill, 2009.
3. Luger G F, *Artificial Intelligence*, 6th edition, Pearson Education, 2009.
4. Carter M, *Minds and Computers: An Introduction to the Philosophy of Artificial Intelligence*, Edinburgh University Press, 2007.
5. Coppin B, *Artificial Intelligence Illuminated*, Jones & Bartlett, 2004.
6. Ertel W, *Introduction to Artificial Intelligence*, Springer, 2011.

COURSE OUTCOMES:

CO1 Demonstrate basic understanding of artificial intelligence and its fundamentals.

CO2 Possess the skill for representing knowledge using the appropriate technique for a given problem.

CO3 Possess the ability to apply AI techniques to solve problems of game playing, expert systems, machine learning and robotics.

CO4 Identify a search algorithm for a problem and estimate its time and space complexities.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	3	-	2	-	1	-	3	2
CO2	2	3	2	2	2	2	-	-	2	-	2	2
CO3	2	3	2	2	2	2	2	-		-	2	2
CO4	2	3	2	3	1	2	-	-	3	-	2	1
CO5	3	2	2	3	3	-	2	-	1	-	3	2

CST22

COMPILER CONSTRUCTION

No. of Credits: 4 Instruction Hours / Week: 4

UNIT I

Introduction: Language Processors, The Structure of a Compiler, The Evolution of Programming Languages, The Science of Building a Compiler, Applications of Compiler Technology, Programming Language Basics.

A Simple Syntax-Directed Translator: Introduction, Syntax Definition, Syntax-Directed Translation, Parsing, A Translator for Simple Expressions, Lexical Analysis, Symbol Tables, Intermediate Code Generation.

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

UNIT II

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars, Parser Generators.

UNIT III

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's.

Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Translation of Expressions, Type Checking, Control Flow, Backpatching, Switch-Statements, Intermediate Code for Procedures.

UNIT IV

Run-Time Environments: Storage Organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection, Short-Pause Garbage Collection, Advanced Topics in Garbage Collection.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Instruction Selection by Tree Rewriting, Optimal Code Generation for Expressions, Dynamic Programming Code-Generation.

UNIT V

Machine-Independent Optimizations: The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs, Region-Based Analysis, Symbolic Analysis.

Instruction-Level Parallelism: Processor Architectures, Code-Scheduling Constraints, Basic-Block Scheduling, Global Code Scheduling, Software Pipelining.

Optimizing for Parallelism and Locality: Basic Concepts, Matrix Multiply: An In-Depth Example, Iteration Spaces, Affine Array Indexes, Data Reuse, Array Data-Dependence Analysis, Finding Synchronization-Free Parallelism, Synchronization Between Parallel Loops, Pipelining, Locality Optimizations, Other Uses of Affine Transforms.

Inter-procedural Analysis: Basic Concepts, Why Interprocedural Analysis, A Logical Representation of Data Flow, A Simple Pointer-Analysis Algorithm, Context-Insensitive Interprocedural Analysis,

Context-Sensitive Pointer Analysis, Datalog Implementation by BDD's.

Text Book:

Aho A V, Sethi R, and Ullman J D, *Compilers-Principles, Techniques and Tools*, 2nd edition, Pearson Education, 2006.

Reference Books:

1. Raghavan V, *Principles of Compiler Design*, Tata McGraw Hill, 2010.
2. Grune D, Bal H E, Jacobs C J H, and Langendoen K G, *Modern Compiler Design*, Wiley, 2000.
3. Appel A W, *Modern Compiler Implementation in C*, Cambridge University Press, 2000.

COURSE OUTCOMES:

CO1 Master using lexical analyzer and parser generator tools.

CO2 Master building symbol tables and generating intermediate code.

CO3 Master generating assembly code for a RISC machine.

CO4 Master programming in Java. Be familiar with compiler architecture.

CO5 Be familiar with register allocation.

CO6 Be exposed to compiler optimization

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3		2							
CO2	3		2	3								
CO3	2	3	3	2		1		2				
CO4		3	3		2						1	
CO5	3	3		2		2						
CO6	3	2		3		1			2			

CSE02

ELECTIVE II

CYBER SECURITY

No. of Credits: 4 Instruction Hours / Week: 4

UNIT-I

Introduction: OSI Security Architecture - Classical Encryption techniques – Cipher Principles – Data Encryption Standard – Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES – AES Cipher – Triple DES – Placement of Encryption Function – Traffic Confidentiality

UNIT-II

Public Key Cryptography Key Management - Diffie-Hellman key Exchange – Elliptic Curve

Architecture and Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public Key Cryptography and RSA.

UNIT-III

Authentication And Hash Function: Authentication requirements – Authentication functions – Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs – MD5 message Digest algorithm - Secure Hash Algorithm – RIPEMD – HMAC Digital

UNIT-IV

Network Security Authentication Applications: Kerberos – X.509 Authentication Service – Electronic Mail Security – PGP – S/MIME - IP Security – Web Security.

UNIT-V

System Level Security Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.

Text Book:

1. William Stallings, "Cryptography And Network Security – Principles and Practices", Prentice Hall of India, Third Edition, 2003.

References:

1. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003.
2. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education.

COURSE OUTCOMES:

CO1 Analyze and evaluate the cyber security needs of an organization.

CO2 Conduct a cyber security risk assessment. Measure the performance and troubleshoot cyber security systems.

Implement cyber security solutions.

CO3 Be able to use cyber security, information assurance, and cyber/computer forensics software/tools

CO4 Identify the key cyber security vendors in the marketplace.

CO5 Design and develop a security architecture for an organization.

Design operational and strategic cyber security strategies and policies.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	3	-	-	-	3	-	-	2
CO2	3	3	-	-	3	-	-	-	3	-	-	2
CO3	3	3	3	-	3	-	-	-	3	-	-	-
CO4												

	3	3	3	1	3	-	-	-	3	-	-	-
CO5	3	3	3	1	3	-	-	-	3	-	-	2

ELECTIVE III

CSE03 **DATA ANALYTICS**

No. of Credits: 4 Instruction Hours / Week: 4

UNIT-I

Descriptive Statistics - Introduction to the course, Descriptive Statistics, Probability Distributions
Inferential Statistics - Inferential Statistics through hypothesis tests, Permutation & Randomization Test

UNIT-II

Regression & ANOVA - Regression, ANOVA(Analysis of Variance)
Machine Learning: Introduction and Concepts - Differentiating algorithmic and model basedframeworks, Regression: Ordinary Least Squares, Ridge Regression, Lasso Regression,K-Nearest Neighbours Regression & Classification

UNIT-III

Supervised Learning with Regression and Classification techniques - Bias-Variance Dichotomy, Model Validation Approaches, Logistic Regression, Linear Discriminant Analysis, Quadratic Discriminant Analysis, Regression and Classification Trees, Support Vector Machines, Ensemble Methods: Random Forest, Neural Networks, Deep learning

UNIT-IV

Unsupervised Learning and Challenges for Big Data Analytics – Clustering, Associative Rule Mining, Challenges for big data analytics.

UNIT-V

Prescriptive analytics - Creating data for analytics through designed experiments, Creating data for analytics through Active learning, Creating data for analytics through Reinforcement learning.

Textbooks:

1. Hastie, Trevor, et al "The elements of statistical learning", Volume 2, No. 1, New York: springer, 2009.
2. Montgomery, Douglas C., and George C. Runger", Applied statistics and probability for engineers", John Wiley & Sons, 2010.

COURSE OUTCOMES

CO1 Understand Big Data and its analytics in the real world

CO2 Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics

CO3 Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	1
CO2												

	3	3	3	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	2	-	-	-	-	-	-

HUT10 **MANAGERIAL ACCOUNTANCY**

No. of Credits: 2 Instruction Hours / Week: 2

UNIT I

Management Accounting – Definition, Objectives, Scope and Functions.
Financial Accounting – Introduction, Process, Principles and Concepts.
Financial Statements – Trading Account, Balancing Process, Profit & Loss Account and Balance Sheet.

UNIT II

Financial Statement Analyses – Trend Percentage Analysis, Ratio Analysis, Fund Flow Statement Analysis, Cash Flow Statement Analysis

UNIT III

Methods of Depreciation – Straight line, Depletion, Machine Hour Rate, Diminishing Balance, Sum of Digits, Sinking Fund and Insurance Policy Methods.
Inventory Valuation Methods – FIFO, LIFO, Average Weighted Average, Base Stock and HIFO Methods.

UNIT IV

Capital Budgeting – Pay Back Period, ARR, NPV, PI and IRR Methods.
Unit Costing – Introduction, Direct Cost Classification and Indirect Cost Classification.
Introduction to Process Costing, Job Costing and Activity Based Costing

UNIT V

Marginal Costing – Introduction, Definition, Meaning and BEP Analysis and BEP in units.
Standard Costing – Introduction, Variance Analysis Material Cost Variance, Material Price Variance, Labor Variance, and Sales Variance.
Budgetary Control – Introduction and Classification of Budgets, Production, Material / Purchase, Sales, Sales Overhead, Cash and Factory Overheads Budgets. Flexible Budget.

Text Book:

Pandikumar M P, *Management Accounting: Theory and Practice*, 1st Edition, Excel Books, 2007.

UNIT	Chapters
I	1,2 and 3
II	5,6,7 and 8
III	4 and 11
IV	9,10, 13 , 14 and 18

V	15, 16 and 17

Reference Books:

1. Khan M Y, Jain P K, *Management Accounting*, 4th Edition, Tata McGraw-Hill, 2007.
2. Balakrishnan R, Sivaramakrishnan K, Sprinkle G B, *Managerial Accounting*, Wiley, 2010.

COURSE OUTCOMES:

CO1 Understand various costing systems and management systems . Analyse and provide recommendations to improve the operations of organisations through the application of Cost and Management accounting techniques

CO2 Evaluate the costs and benefits of different conventional and contemporary costing systems

CO3 Differentiate methods of schedule costs as per unit of production . Differentiate methods of calculating stock consumption

CO4 Identify the specifics of different costing methods

CO5 Analyze cost-volume-profit techniques to determine optimal managerial decisions.

CO6 Apply cost accounting methods for both manufacturing and service industry.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2									3	2	
CO2				1		2			2		3	
CO3		1			3				3	2		2
CO4			2			2		2		3	3	
CO5		1							3	2	3	2
CO6				2		2				3		

CSP13

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
B.Tech (CSE) – VIISEMESTER (CBCS)
CORE LAB

No. of Credits: 2 Instruction Hours / Week: 4

COURSE OUTCOMES:

CO1 To Program using lexical analyzer and parser generator tools.

CO2 building symbol tables and generating intermediate code.

CO3 generating assembly code for a RISC machine.

CO4 programming in Java. Be familiar with compiler architecture.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		3		2				1		
CO2		3	2	3		1						
CO3	2	3	1			3			2			
CO4	3		2	3			2					

CSP14

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

B.Tech **(CSE) – VII SEMESTER (CBCS)**
ELECTIVE-I LAB

.No. of Credits: 2 Instruction Hours / Week: 4

COURSE OUTCOMES:

CO1 Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm

CO2 Conduct a cyber security risk assessment. Measure the performance and troubleshoot cyber security systems.

Implement cyber security solutions.

CO3 Design and develop a security architecture for an organization.

CO4 Design operational and strategic cyber security strategies and policies.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3		2		2			1				
CO2		2	2	3		2						
CO3	2	2	3		2		2					
CO4		3	2	2		1						

CSE 24-1 **B.Tech (CSE) - VIII SEMESTER (CBCS)**
Elective IV

Cloud Computing

No. of Credits: 4 Instruction Hours / Week: 4

UNIT I

Introduction: Definition, Historical developments, Computing platforms and technologies.
Principles of Parallel and Distributed Computing: Parallel versus distributed computing, Elements of parallel computing, Elements of distributed computing, Technologies for distributed computing.

UNIT II

Virtualization: Characteristics, Virtualization techniques, Virtualization and cloud computing, Pros and cons of virtualization, Technology examples.
Cloud Computing Architecture: Cloud reference model, Types of clouds, Economics of clouds, Open challenges.
Aneka: Cloud Application Platform: Framework overview, Anatomy of the Aneka container, Building Aneka clouds, Cloud programming and management.

UNIT III

Concurrent Computing- Thread Programming: Programming applications with threads, Multithreading with Aneka, Programming applications with Aneka threads.
High Throughput Computing- Task Programming: Task computing, Task-based application models, Aneka task-based programming.

UNIT IV

Data Intensive Computing – Map-Reduce Programming: Introduction, Technologies for data-intensive computing, Aneka MapReduce programming.
Cloud Platforms in Industry: Amazon web services, Google AppEngine, Microsoft Azure.

UNIT V

Cloud Applications: Scientific applications in – Healthcare, Biology, Geo-science; Business applications in – CRM and ERP, Productivity, Social networking, Media applications, Multiplayer online gaming.
Advanced Topics in Cloud Computing: Energy efficiency in clouds, Market based management of clouds, Federated clouds / InterCloud, Third party cloud services.

Text Book:

1. Buyya R, Vecchiola C, Selvi S T, *Mastering Cloud Computing*, McGraw Hill, 2013.
2. Zaigham Mahmood, Pamela J. Wise-Martinez, Thomas Erl, Ricardo Puttini Cloud Computing - Concepts, Technology & Architecture, Pearson, 2014

Reference Books:

1. Rittinghouse J W, Ransome J F, *Cloud Computing - Implementation, Management, and Security*, CRC Press, 2010.
2. Velte A T, Velte T J, *Cloud Computing - A Practical Approach*, McGraw Hill, 2011.
3. Sosinsky B, *Cloud Computing Bible*, Wiley, 2011.

CSE 24-2 **B.Tech (CSE) - VIII SEMESTER (CBCS)**

Elective IV

Computer Graphics

No. of Credits: 4 Instruction Hours / Week: 4

UNIT I

Introduction- Image processing as picture analysis, Advantages of Interactive Graphics, Representative uses of computer graphics, Classification of applications, Development of hardware and software for computer graphics, Conceptual framework for Interactive Graphics.

Scan Converting Lines – Basic Incremental algorithm, Midpoint Line algorithm and additional issues; Scan Converting Circles, Scan Converting Ellipses, Solid Filling– Rectangles, Polygons and Ellipse arcs; Pattern filling, Thick primitives, Cohen-Sutherland line clipping algorithm, Parametric line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm, Generating characters and Antialiasing.

UNIT II

Display Systems - Raster-scan and Random scan.

Geometrical transformations – 2D transformations, Homogeneous coordinates, Matrix representation of 2D transformations, Composition of 2D transformations, Window to view-port transformation, Matrix representation of 3D transformations, Composition of 3D transformations and Transformation as a change in coordinate system.

Representing Curves and surfaces – Polygon meshes, Parametric cubic curves, Parametric bicubic surfaces andQuadric surfaces.

Fractals – Lines and Surfaces.

UNIT III

Viewing in 3D - Projections, Specifying an arbitrary 3D view, Examples of 3D viewing, Mathematics of planar geometric projections, Implementing planar geometric projections, Coordinate systems.

Solid Modeling – Representing solids, Regularized Boolean set operations, Primitive instancing, Sweep representations, Boundary representations, Spatial-Partitioning Representations, Constructive solid geometry, Comparison of representations, User interfaces for solid modeling.

UNIT IV

Achromatic and Colored Light – Achromatic light, Chromatic color, Color models for raster graphics, Reproducing color, Using color in computer graphics.

Visible Surface Determination – Functions of two variables, Techniques for efficient visible surface algorithms, z-Buffer algorithm, Scan-line algorithms, Visible surface ray tracing.

UNIT V

Illumination Models - Ambient light, Diffuse reflection, Atmospheric attenuation.

Shading4 Models – Constant shading, Interpolated shading, Polygon mesh shading, Gouraud shading, Phong shading, Problems with interpolated shading.

Surface Detail – Surface-detail polygons, Texture mapping, Bump mapping.

Animation – Conventional and Computer-Assisted animation, Animation languages, Methods of controlling animation, Basic rules of animation, Problems peculiar to animation.

Text Book:

Hughes J F, Van Dam A, Foley J D, et al., *Computer Graphics: Principles and Practice*, 3rd edition, Addison-Wesley, 2013.

Reference Books:

1. Foley J D, Van Dam A, Feiner S K, John F H, *Computer Graphics: Principles & Practice in C*, 2nd edition, Pearson Education, 1995.

COURSE OUTCOMES:

CO1 Image processing as picture analysis

CO2 Geometrical transformations and 2D ,3D operations

CO3 Viewing in 3D projections

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2			1	1					
CO2	3	2	3	1		2			1	3		
CO3	2	3	1	3		3	2	3		2	3	

MET 42 **Industrial Management**

No. of Credits: 3 Instruction Hours / Week: 2

UNIT-I

Definition of Management, Management Functions, Management and Administration, Nature of Management, Universality of Management Principles of Management, Organization Approaches, Organization Structures and Process of Organizing

Nature and Scope of Financial management, Capital Budgeting, Cost of Capital and Working Capital Management

UNIT-II

Facilities Planning – Definition, Significance, Objectives and Process. Location models, Plant Location Problem and Basic Layout Types

Material Handling – Definition, Principles, System Design and, Equipment

Process Design – Identifying, Selecting and Sequencing the Required Processes

UNIT-III

Aggregate Production Planning, material Requirements Planning and Project Planning and Scheduling

UNIT-IV

Job Sequencing and Operations Scheduling, New Direction in Batch and Discrete-parts Production Systems and Plant Maintenance

Purchasing – Objectives, Responsibilities, Policies, Practices, Procedures, Organization for Purchasing and Relationship of Purchasing with Other Departments

UNIT-V

Marketing Management – Nature and Functions of Marketing, Distribution Channels and Marketing Research.

Human Resources Development – Dynamic Personnel Management, Staffing Policies and Process, and Wage and Salary Policies and Administration.

Text Books:

1. R D Agarwal, Organization and Management, Tata McGraw – Hill, 2000 (Chapters 1, 7, 8, 24, 26, 31, 36, 37 and 41 to 46)
2. James A Tompkins and John A White, Facilities Planning, John Wiley & Sons 1954 (Sections

1.1, 1.2, 1.3, 1.4, 3.3, 6.1, 6.2, 6.4, 6.6, 7.1, 7.2, 15.2, 15.4)
3. Elsaye A Elsayed and Thomas O Boucher, Analysis and Control of Production Systems, prentice-Hill, 1985 (Chapters 4to 8)
4. O.P Khanna, Industrial Engineering and Management , Dhanpat Rai Publication, Reprint 20003 (Chapter)

COURSE OUTCOMES:

CO1 Understand the concepts related to Business.

CO2 Demonstrate the roles, skills and functions of management.

CO3 Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.

CO4 : Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3		3	3				1			
CO2		3	3		2		2					
CO3		2		2		3						
C04	2	3			3			2				

HUT 02

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
B.Tech (CSE) - VIII SEMESTER (CBCS) Managerial Economics

No. of Credits: 2 Instruction Hours / Week: 2

UNIT I

Introduction - Nature and Scope of Managerial Economics, Economic Theory and Managerial Economics, Managerial Economist: Role and Responsibilities.
Demand Analysis and Forecasting – Demand Determinants, Demand Distinctions, Demand Forecasting: General Considerations, Methods of Demand Forecasting.

UNIT II

Cost Analysis – Cost Concepts, Classifications and Determinants; Cost-Output Relationship, Economies and Diseconomies of Scale, Cost Control and Cost Reduction.
Production and Supply Analysis – Production Functions, Supply Analysis.

UNIT III

Price and Output Decisions Under Different Market Structures – Perfect Competition, Monopoly and Monopsony; Price Discrimination, Monopolistic Competition, Oligopoly and Oligopsony.

UNIT IV

Pricing Policies and Practices – Pricing Policies, Pricing Methods, Specific Pricing Policies, Price Discounts and Differentials; Product-line Coverage and Pricing; Price Forecasting.

UNIT V

Profit Management – Nature of Profit, Measuring Accounting Profit,Profit Policies, Profit Planning and Forecasting.
Capital Management - Capital Budgeting, Cost of Capital, Appraising Project Profitability, Risk, Probability and Investment Decisions.

Text Book:

1. Varshney R L and Maheshwari K L, *Managerial Economics*, 19th Edition, Sultan Chand and Sons, 2009.
2. Managerial Economics and Business Strategy (English, Paperback, Michael R. Baye), Tata McGraw-Hill, 2008

Reference Books:

1. Froeb L M, and McCann B T, *Managerial Economics: A Problem Solving Approach*, Cengage Learning, 2008.
2. Dean J, *Managerial Economics*, PHI, 2010.

COURSE
OUTCOMES:

CO1 Recognize financial statements, their importance and usages.

CO2 Understand major principles of financial accounting, cost accounting and financial management.

CO3 Utilize the tools and techniques for economic analysis of alternative opportunities, considering time value of money and risk associated with returns.

CO4 Appraise investment opportunities considering forthcoming changes in economy, including inflation and their effect.

CO5 Rank the opportunities with proper justifications

CO6 Make optimal engineering investment decisions.

MappingofCourseOutcomeswithProgramOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2									3	2	
CO2				1		2			2		3	
CO3		1			3				3	2		2
C04			2			2		2		3	3	
CO5		1							3	2	3	2
CO6				2		2				3		