Computer Science & Enginerring
Course Structure
I Year, Semester- I(1st Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CS1T01	HSMC	English-I	2	-	-	2	2
2	18CS1T02	BSC	Linear Algebra &Differential Equations	3	1	-	4	4
3	18CS1T03	BSC	Applied Physics	3	-	-	3	3
4	18CS1T04	ESC	Problem Solving Approaches	3	-	-	3	3
5	18CS1T05	ESC	Engineering Graphics	3	-	-	3	3
6	18CS1L06	HSMC	English Communication Skills Lab-I	-	-	2	2	1
7	18CS1L07	BSC	Applied Physics Lab	-	-	3	3	1.5
8	18CS1L08	ESC	Problem Solving Approaches Lab	-	-	3	3	1.5
9	18CS2L09	ESC	IT Workshop	-	-	2	2	1
Total Number of Credits								**20**

I Year, Semester- II(2nd Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CS2T01	HSMC	English-II	1	-	**2**	3	2
2	18CS2T02	BSC	Vector Calculus & Fourier Transforms	3	-	-	3	3
3	18CS2T03	BSC	Applied Chemistry	3	-	-	3	3
4	18CS2T04	BSC	Biology for Engineers	2	-	-	2	2
5	18CS2T05	ESC	Basic Electrical & Electronics Engineering	3	-	-	3	3
6	18CS2T06	ESC	Data Structures through C	3	1	-	4	4
7	18CS2L07	BSC	Applied Chemistry Lab	-	-	3	3	1.5
8	18CS2L08	ESC	Data Structures through C Lab	-	-	3	3	1.5
9	18CS2T09	MC	Environmental Studies	-	-	2	2	-
Total Number of Credits								**20**

II Year, Semester- I(3rd Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CS3T01	BSC	Probability & Statistics	3			3	3
2	18CS3T02	PCC	Object Oriented Programming	3			3	3
3	18CS3T03	PCC	Advanced Data Structures	3			3	3
4	18CS3T04	ESC	Digital Logic Design	3			3	3
5	18CS3T05	HSMC	Effective Technical Communication	3			3	3
6	18CS3L07	PCC	Object Oriented Programming Lab			4	2	2
7	18CS3L08	PCC	Advanced Data Structures Lab			4	2	2
8	18CS3L09	ESC	R programming Lab			4	2	2
9	18CS3T06	MC	Indian Constitution	2			2	--
10	18CS3L10	P	Technical Seminar	1			1	1
Total Number of Credits								**22**

II Year, Semester- II(4th Semester)

S.No	Course Code	Course Category	Course Title	Hours per week			Total Contact Hours	Credits
				Lecture	Tutorial	Practical		
1	18CS4T01	PCC	Discrete Mathematics	2			2	2
2	18CS4T02	PCC	Database Management Systems	3			3	3
3	18CS4T03	PCC	Computer Organization & Architecture	2			2	2
4	18CS4T04	PCC	Operating Systems	3			3	3
5	18CS4T05	HSMC	Managerial Economics and Financial Analysis	3			3	3
6	18CS4T06	HSMC	Professional Ethics	3			3	3
7	18CS4L07	PCC	Operating Systems &linux programmingLab			4	2	2
8	18CS4L08	PCC	Database Management Systems Lab			4	2	2
9	18CS4L09	ESC	Python Programming Lab			4	2	2
Total Number of Credits								**22**

III Year, Semester- I (5th Semester)

S.No	Course Code	Course Category	Course Title		Hours per week			Total Contact Hours	Credits
					Lecture	Tutorial	Practical		
1.	18CS5T01	PCC	Data Mining & Warehousing		2	1	-	3	3
2.	18CS5T02	PCC	Web Technologies		2	-	-	2	2
3.	18CS5T03	PCC	Design and Analysis of Algorithms		2	1	-	3	3
4.	18CS5T04	PCC	Formal Languages & Automata Theory		2	-	-	2	2
5.	18CS5T 05/06/07	PEC	**Program Elective-I**		2	1	-	3	3
			18CS5T05	Object Oriented Analysis and Design					
			18CS5T06	Advanced Computer Architecture					
			18CS5T07	Advanced Operating Systems					
6.	**OEC Open Elective-I**				3	-	-	3	3
7.	18CS5L16	PCC	Data Mining Lab		-	-	3	1.5	1.5
8.	18CS5L17	PCC	Web Technologies Lab		-	-	3	1.5	1.5
								Total Number of Credits	**19**

Course Structure for III Year, Semester- II (6th Semester)

S.No	Course Code	Course Category	Course Title		Hours per week			Total Contact Hours	Credits
					Lecture	Tutorial	Practical		
1	18CS6T01	PCC	Compiler Design		2	1	-	3	3
2	18CS6T02	PCC	Computer Networks		3	-	-	3	3
3	18CS6T03	PCC	Software Engineering		3	-	-	3	3
4	18CS6T 04/05/06	PEC	**Program Elective-II**		3	-	-	3	3
			18CS6T04	Unix & Shell Programming					
			18CS6T05	Internet of Things					

			18CS6T06	Distributed Systems					
5	**OEC Open Elective-II**				3	-	-	3	3
6	18CS6L21	PCC	Computer Networks Lab		-	-	4	2	2
7	18CS6L22	PCC	Software Engineering Lab		-	-	4	2	2
8	18CS6T23	MC	Essence of Indian Traditional Knowledge		2	-	-	2	--
								Total Number Of Credits	**19**

Course Structure for IV Year, Semester- I (7th Semester)

S.No	Course Code	Course Category	Course Title		Hours per week			Total Contact Hours	Credits
					Lecture	Tutorial	Practical		
1	18CS7T01	PCC	Big Data & Hadoop		3	-	-	3	3
2	18CS7T02	PCC	Cryptography & Network Security		2	1	-	3	3
3	18CS7T 03/04/05	PEC	**Program Elective-III**		2	1	-	3	3
			18CS7T03	Machine Learning & Deep Learning					
			18CS7T04	Soft Computing					
			18CS7T05	Data Analytics					
4	18CS7T 06/07/08	PEC	**Program Elective-IV**		3	-	-	3	3
			18CS7T06	Embedded Systems					
			18CS7T07	Software Testing Methodologies					
			18CS7T08	Software Project Management					
5	**OEC Open Elective-III**				3	-	-	3	3
6	18CS7L20	PCC	Big Data & Hadoop Lab		-	-	4	2	2
7	18CS7L21	PROJ	Mini Project /Internship		-	-	4	2	2
								Total Number Of Credits	**19**

Course Structure for IV Year, Semester- II (8th Semester)

S.No	Course Code	Course Category	Course Title		Hours per week			Total Contact Hours	Credits
					Lecture	Tutorial	Practical		
1	18CS8T 01/02/03	PEC	**Program Elective-V**		3	-	-	3	3
			18CS8T 01	Cloud Computing					
			18CS8T 02	Mobile Computing					
			18CS8T 03	Image Processing					
2	18CS8T 04/05/06	PEC	**Program Elective-VI**		3	-	-	3	3
			18CS8T 04	Adhoc And Sensor Networks					
			18CS8T 05	Human Computer Interaction					
			18CS8T 06	Artificial Intelligence & Neural Networks					
3	**OEC Open Elective-IV**				3	-	-	3	3
4	**OEC Open Elective-V or MOOC**				2	-	-	2	2
5	18CS8L22	PROJ	Major Project		-	-	16	8	8
Total Number Of Credits									**19**

Open Elective 1

S.No	Course Code	Course Title	Offering Dept
1	18CS5T08	Employability Skills: Competitive Coding	CSE/IT
2	18CS5T09	Optimization Techniques	BED
3	18CS5T10	Electrical Engineering Materials	EEE
4	18CS5T11	Basics of Control Systems	EEE
5	18CS5T12	Design Thinking &Product Innovation	ME
6	18CS5T13	Solid State Devices and Circuits	ECE
7	18CS5T14	Principles of Communication	ECE
8	18CS5T15	Employability Skills: Quantitative Aptitude & Reasoning	BED

Open Elective II

S.No	Course Code	Course Title	Offering Dept
1	18CS6T07	Employability Skills: Quantitative Aptitude & Reasoning	BED
2	18CS6T08	Basic Civil Engineering	CE
3	18CS6T09	Sustainable Engineering Practices	CE
4	18CS6T10	Disaster Management	CE
5	18CS6T11	Low Cost Housing	CE
6	18CS6T12	Design and Estimation of Electrical Systems	EEE
7	18CS6T13	Energy Audit, Conservation and Management	EEE
8	18CS6T14	Nanotechnology	ME
9	18CS6T15	Microprocessors and microcontroller	ECE
10	18CS6T16	Embedded Systems	ECE
11	18CS6T17	Employability Skills: Competitive Coding	CSE/IT
12	18CS6T18	Computer Networks	CSE/IT
13	18CS6T19	Managerial Economics and Financial Analysis	DMS
14	18CS6T20	Cross Cultural management	DMS

Open Elective III

S.No	Course Code	Course Title	Offering Dept
1	18CS7T09	Fuzzy Sets and Fuzzy Logic	BED
2	18CS7T10	Remote sensing and GIS	CE
3	18CS7T11	Green Buildings	CE
4	18CS7T12	Electric Vehicles	EEE
5	18CS7T13	Special Electrical Machines	EEE
6	18CS7T14	Bio Medical Instrumentation	ECE
7	18CS7T15	Nano Electronics	ECE
8	18CS7T16	Software Project Management.	CSE/IT
9	18CS7T17	Computer Architecture & Organization	CSE/IT
10	18CS7T18	Technology Innovation Management	DMS
11	18CS7T19	Global Environment Trends	DMS

Open Elective IV

S.No	Course Code	Course Title	Offering Dept
1	18CS8T07	Soft Computing Techniques	ECE
2	18CS8T08	Satellite communication	ECE
3	18CS8T09	Internet of Things	CSE
4	18CS8T10	Utilization of Electrical Energy	EEE
5	18CS8T11	Mechatronics	ME
6	18CS8T12	Green Engineering Systems	ME
7	18CS8T13	Micro - Electro - Mechanical Systems	ME
8	18CS8T14	Advanced Drawing for Civil Engineers	CE
9	18CS8T15	Polymer Chemistry	BED

Open Elective V

S.No	Course Code	Course Title	Offering Dept
1	18CS8T16	Operating Systems	CSE
2	18CS8T17	Robotics	ME
3	18CS8T18	Solar Energy Systems	ME
4	18CS8T19	Power Quality	EEE
5	18CS8T20	Additive Manufacturing	ME
6	18CS8T21	Advanced Civil Engineering Technologies	CE

Note: **Open Electives shall be selected in consultation with the department and prior approval is required**

I YEAR
SEMESTER-I
SYLLABUS

ENGLISH-1

I Year – I Semester

Lecture: 2 Practical: 0 Internal Marks: 30

Credits: 2 Tutorial: 0 External Marks: 70

Prerequisites: -

Course Outcomes

CO 1: Use English language, both written and spoken, competently and correctly.

CO 2: Improve comprehension and fluency of speech.

CO 3: Gain confidence in using English in verbal situations.

CO 4: Hone the communication skills to meet the challenges of their careers very successfully.

CO 5: Strengthen communication skills in different contexts like formal and informal.

CO 6: Develop knowledge of different fields and serve the society accordingly

Syllabus:

Unit 1 Human Resources : Ideal Family

Unit 2 In London:Verger

Unit 3 Our Living Environment: Three Days to See

Unit 4 Energy: Alternative Sources: War

Unit 5 Principles of Good Writing : Letter Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS

I Year – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 4	Tutorial: 1	External Marks: 70

Prerequisites: -

Course Outcomes:

1. Apply the knowledge to solve a system of homogeneous and non homogeneous linear equations
2. Illustrate the methods of computing eigen values and eigen vectors
3. Able to analyze the real life situations, formulate the differential equations then apply the solving methods
4. Explain the techniques of solving the linear differential equations
5. Optimize functions of several variables and able to find extreme values of constrained functions

Syllabus:

UNIT I: Linear systems of equations, Eigen values & Eigen vectors

Rank of a matrix, Echelon form, Normal form, PAQ is in normal form, linear dependence and independence, Consistency of linear system of equations, System of linear homogeneous equations.Gauss -Jordan method, LU decomposition method,

Application: Finding the current inelectrical circuits, Eigen values, Eigen vectors, Properties of Eigen values(without proofs).

UNIT II: Quadratic forms & Differential calculus:

Cayley-Hamilton theorem(without proof), Reduction to diagonal form, Reduction of quadratic form to canonical form, Nature of quadratic form. Limits and continuity and differentiability, Mean value theorems, Taylor's and Maclaurin's series.Functions of two variables, Partial derivatives, Homogeneous functions, Total derivative, Jacobian, Taylor's theorem for functions of two variables.

Applications: Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT III: Differential equations of first order:

Formation of a differential equation, Solution of a differential equation, Variables separable method, Linear equations, Bernoulli's equation, Exact differential equations.Equations reducible to exact equations.

Applications: Orthogonal Trajectories, Newton's Law of cooling, Rate of decay & growth.

UNIT IV: Differential equations higher order:

Definitions, Complete solution, Operator D, Rules to find Complementary function, Inverse operator, Rules to find the particular integral(RHS term of the type e^{ax} , Sin(ax+b), cos(ax+b), polynomials in x).Rules to find the particular integral(RHS term of the type e^{ax} V(x), any other function), Method of variation of parameters. **Application:** L-C-R circuits.

UNIT V: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t. Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application**: Application to differential equations.

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. . P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

2.ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

APPLIED PHYSICS

I Year – I Semester

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

Prerequisites: -

Course Outcomes

1: Study of lasers and optical fibers with an emphasis of their application in communication in particular.

2: Outline the principles of Quantum mechanics to understand the principles of solid state materials for use in engineering applications.

3: The Analytical study of response of materials to Electromagnetic fields.

4: To study various magnetic and dielectric materials and their Engineering applications.

5: To Gain knowledge on the physics of semiconductors for their engineering applications.

SYLLABUS

UNIT –I

LASERS

Characteristics of Lasers – Spontaneous and Stimulated Emission – Population Inversion - Einstein Coefficients – Ruby Laser – He-Ne Laser – Recording and Reconstruction of Holography- Applications.

OPTICAL FIBERS

Principle of Optical fiber – construction – Acceptance angle – Numerical Aperture – Types of Optical fibers – Single and Multi mode, Step Index and Graded Index fibers — Advantages of Optical Fibers in Communication – Applications in Communication.

UNIT – II

QUANTUM THEORY OF SOLIDS

Matter waves – Physical significance of wave function – Schrodinger's Time independent wave equation.Schrodinger's Time dependent wave equation - Particle in a 1 Dimensional Potential well.

UNIT-III

ELECTROMAGNETIC FIELDS

Grad – Div – Curl – Gauss and Stoke's theorems – Fundamental Laws of Electromagnetism.

Maxwell's Equations – Poynting vector – Propagation of Electromagnetic waves in a dielectric medium.

UNIT-IV

MAGNETIC MATERIALS

Origin of magnetic moment – Classification of magnetic materials (Dia, Para, Ferro) - Weiss theory of Ferromagnetic domains – Hysteresis – Soft and Hard magnetic materials - Applications.

DIELECTRIC MATERIALS

Types of Polarization – Dielectrics in DC and AC fields – Internal field –ClausiusMossoti Equation – Dielectric Loss and Dielectric Breakdown – Ferroelectric Hysteresis and applications.

UNIT-V

PHYSICS OF SEMICONDUCTORS

Carrier Concentration in Intrinsic semiconductor – Fermi level and electrical conductivity in intrinsic semiconductors - Carrier Concentration in Extrinsic semiconductors – Variation of Fermi level with temperature and impurity concentration.Drift and Diffusion currents – Einstein's relation – Hall Effect & its applications.

Text Books:

1. Engineering Physics by R.K.Gaur and S.L.Gupta – Dhanpatrai Publications
2. Engineering Physics by M.Avadhanuluand P.G. Kshirasagar – S Chand Publications (10^{th} Edition)
3. Applied Physics by S.O.Pillai – New Age Publications – (3^{rd} Edition)

Reference Books:

1. Engineering Physics by P.K.Palanisamy – Scitech Publications (2014 Edition)
2. Engineering Physics by M.Armugam – Anuradha Publications
3. Engineering Physics by M.R.Srinivasan (2014 Edition) New Age International Publications

Problem Solving Approaches

I Year – I Semester

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

Prerequisites: -

Course Outcomes

The student will learn

1. To formulate simple algorithms for arithmetic, logical problems and translate them to programs in c language.
2. To implement conditional branching, iteration and recursion.
3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
4. To use arrays, pointers and structures to formulate algorithms and programs.
5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
6. To use structures and files

SYLLABUS

UNIT – I:

Introduction to Computer Problem Solving: Programs and Algorithms, characteristics of an algorithm, Flowchart,Pseudo-code, TheProblem – Solving Aspect, Top-Down design

Fundamental Algorithms Introduction,Summation of a set of numbers, Factorial computation, Generation of Fibonacci sequence, reversing the digits of an Integer.

UNIT – II:

Factoring Methods: Introduction,GCD of two Integers, Generating Prime numbers, Computing the Prime Factors of an Integer, Generation of pseudo-random numbers

Array Techniques: Introduction, Array Order Reversal, Finding the Maximum number in a set, Removal of duplicates from an ordered array, Partitioning an Array

UNIT-III:

Programming Languages and Introduction to C Programming: Properties of Machine Language, Assembly Language, High-Level Languages, Procedural and Object-Oriented Languages.Structure of C program, Indentation, Comments,Identifiers& variables, DataTypes

Interactive Input, Formatted Output, FormatModifiers, Operators, Operator precedence & Associativity, Relational expressions, Type Casting,Mathematical Library Functions, Selection control statements: if and switch

UNIT -IV:

Repetition structures: Basic Loop Structures: while, for , do-while, Nested loops, **Modular Programming:** Functions and parameter declarations, Returning a Value,Functions with Empty Parameter Lists,Variable Scope

Modular Programming Variable Storage Class: Local, Global,**Pointers:** declaration and its usage, Functions with parameters: pass by value, pass by address, pointer to a function and function pointer

UNIT-V:

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Arrays as Function Arguments, Two-Dimensional Arrays, Larger Dimensional Arrays- Matrices

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions related to strings.

TEXT BOOKS:

[1] R.G. Dromey, "How to Solve it By Computer", Prentice-Hall International Series in Computer Science,1982.

[2] ReemaThareja, "Computer Fundamentals and C Programming", Oxford, 2012

REFERENCE BOOKS:

[1] DENNIS M. RITCHIE, BRIAN W KERNIGHAN, " The C Programming Language", Prentice-Hall International Series in Computer Science, Second Edition.

[2] Michael Schneider, Steven W. Weingart, David M. Perlman, "An Introduction toProgrammingandProblemSolvingWithPascal",JohnWileyandSonsInc ,1984.

[3] David Gries, "The Science of Programming", Springer Verlag,1981.

ENGINEERING GRAPHICS

I Year – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

Course Outcomes:

1: Draw the polygons, ellipse, parabola, hyperbola, cycloids and involutes for various types of profiles.

2: Construction of various scales like plain, diagonal and venier scales .Draw the orthographic projections of the points, lines.

3: Draw the projections of planes.

4: Draw the projections of solids

5: Convert Orthographic projections to isometric projection and vice versa.

SYLLABUS:

UNIT I:

Lettering,Dimensioning, Geometrical Constructions. Polygons: General construction method, Inscribing and describing methods. Cycloids: Cycloid, Epicycloid, Hypocycloid and Involutes-Tangent and Normals to the above curves.

UNIT II :

Orthographic projections: Introduction, Projections of points.

Projections of straight lines- parallel to both the planes, parallel to one plane and inclined to the other plane.

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

UNIT III

Projections of planes: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane, Projections of planes inclined to both the reference planes.

UNIT IV: Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the reference planes.

Sections of solids: Prisms, Pyramids, Cones and Cylinders in simple positions.

UNIT V:Isometric Projections: Isometric views/projections of planes and simple solids, Conversion of orthographic views to isometric views. Conversion of isometric views to orthographic views. Introduction to AutoCAD

Text Books:

1. Engineering Drawing, N. D. Butt, Chariot Publications
2. Engineering Drawing +Auto CAD, K Venugopal&V Prabhuraja, Newage Publishers.

Reference Books:

1. Engineering Drawing, K. L. Narayana & P. Kannaiah, Scitech Publishers.
2. Engineering Graphics for Degree, K. C. John, PHI Publishers
3. Engineering Drawing, Agarwal & Agarwal, Tata McGraw Hill Publishers
4. Engineering Graphics, P.I. Varghese, McGraw Hill Publishers

ENGLISH COMMUNICATION SKILLS LAB-1

I Year – I Semester

Lecture: 0 Practical: 2 Internal Marks: 40

Credits: 1 Tutorial: 0 External Marks: 60

Prerequisites: -

Course Outcomes

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

List of Experiments:

1 Greetings and Introduction

2 Request Permission & Giving Directions

3 Inviting/Complaining/Congratulating

4 Root Words

5 Phonetics-Sounds and Symbols

6 Pronunciation Rules

References:

1. ***Strengthen Your Steps,*** Maruti Publications

2. ***Interact,*** Orient Blackswan

3. Word Power Made Easy, Pocket Books

APPLIED PHYSICS LAB

I Year – I Semester

Lecture: 0	Practical: 3	Internal Marks: 40
Credits: 1.5	Tutorial: 0	External Marks: 60

Prerequisites: -

(Any 10 of the following listed experiments)

LIST OF EXPERIMENTS:

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating.
5. Determination of Numerical Aperture and bending loss of a given optical fiber.
6. Determination of Rigidity modulus of a material- Torsional Pendulum.
7. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
8. Verification of laws of vibrations in stretched strings - Sonometer
9. Determination of Young's modulus by method of single cantilever oscillations.
10. Melde's experiment – Transverse and Longitudinal modes.
11. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
12. L- C- R Series Resonance Circuit.
13. Study of I/V Characteristics of Semiconductor diode.
14. I/V characteristics of Zener diode.
15. Energy Band gap of a Semiconductor p - n junction.

Problem Solving Approaches Lab

I Year – I Semester

Lecture: 2	Practical: 3	Internal Marks: 40
Credits: 1.5	Tutorial: 0	External Marks: 60

Prerequisites: -

List of Experiments:

1. a. Write an algorithm, flowchart and pseudo code to perform all arithmeticoperations
   b. Write an algorithm, flowchart and pseudo code to find average of threenumbers
   c. Write an algorithm, flowchart and pseudo code to find smallest of threenumbers
2. a. Write an algorithm, flowchart and pseudo code for finding smallest divisor ofan integer.
   b. Write an algorithm, flowchart and pseudo code to find x^y
3. Write a C program to convert temperature from Fahrenheit to Celsius and viceversa.
4. Write a C program to find the roots of quadraticequation
5. Write a C program to find whether a given number isprime
6. Write a C program find whether a given number isarmstrong
7. Write a C program to display reverse of a givennumber
8. Write a C program to generate first n- terms of a fibonaccisequence.
9. Write a C program to calculate sin(x) value, where x is input given byuser
10. Write a C program to calculate cos(x) value, where x is input given byuser
11. Write a C program to perform operations on one dimensionalarray
    a. Smallest element of anarray
    b. Largest element of an array
    c. swap smallest and largest element in anarray
12. Write a C program to implement thefollowing
    a. Addition of twomatrices
    b. Multiplication of twomatrices
13. Write a C program to perform the following operations on strings without using string handlingfunctions
    a. To display length of thestring
    b. To check whether a string ispalindrome
    c. To delete n characters from a given position in a givenstring
14. Write recursive and non recursive programs for thefollowing
    a. Factorial of anumber
    b. GCD of twonumbers
    c. Fibonacciseries
15. Write a program which illustrates Storageclasses

IT WORKSHOP

I Year – I Semester

Lecture: 2 Practical: 2 Internal Marks: 40

Credits: 1 Tutorial: 0 External Marks: 60

Prerequisites: -

LIST OF EXPERIMENTS:

1. **System Assembling, Disassembling and identification of Parts / Peripherals**
2. **Operating System Installation**-Install Operating Systems like Windows, Linux .
3. **MS-Office**
   a. **Word** - Formatting, Page Borders, Reviewing, Equations, symbols.
   b. **Spread Sheet** - organize data, usage of formula, graphs, charts.
   c. **Power point** - features of power point, guidelines for preparing an effective presentation.
   d. **Access**- creation of database, validate data.
4. **Network Configuration & Software Installation**-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. **Internet and World Wide Web**-Search Engines, Types of search engines, netiquette, cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.
7. **MATLAB-** basic commands, subroutines, graph plotting.
8. **LATEX**-basic formatting, handling equations and images.

Text Books:

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition by Gary B. Shelly, Misty E. Vermaat and Thomas J.
3. LATEX- User's Guide and Reference manual, Leslie Lamport, Pearson, LPE, 2/e.
4. Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Rudraprathap, Oxford University Press, 2002.
5. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
6. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
7. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
8. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

I YEAR

SEMESTER-II

SYLLABUS

ENGLISH II

I Year – II Semester

Lecture: 1	Practical: 2	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

Unit 1 Transport: Problems and Solutions

The Scarecrow

Unit 2 The Drunkard

A Village Lost to the Nation

Unit 3 Evaluating Technology

The Knowledge Society

Unit 4 Industry: Safety and Training

Martin Luther King and Africa

Unit 5 Man's Peril (Detailed)

Report Writing

References:

1. English for Engineers and Technologists, Orient Blackswan
2. Prose for Communication, Ravindra Publishing House
3. Panorama, Oxford University Press

ENGLISH COMMUNICATION SKILLS LAB II

1	a.	Introducing Yourself and Other People
		Employability Skills
	b.	Introduction to Soft Skills
		My Skills, My Strengths
2	a.	Discussing Daily Routines
		Free Time Activities
	b.	Describing Family
		Talking about Family
3	a.	Giving Directions
		Ordering Food
	b.	Asking for and Paying the Bill
		Describing Appearances and Personality
4	a.	Writing a Product Description-1
	b.	Writing a Product Description-2
5	a.	Describing an Advertised Job
		Skills Needed for Different Jobs
	b.	What Kind of Job Are You Interested in?
		Finding out about a Job
6.	a.	Managing Nerves in a Presentation
	b.	Learning about Presentations

Reference:

Online Resources:

https://goo.gl/v57WHe

http://www.careerbuilder.co.in

https://goo.gl/w3FweC

https://goo.gl/4GoueJ etc.

VECTOR CALCULUS & FOURIER TRANSFORMS

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

UNIT I: Special functions &Multiple integrals:

Special functions: Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

Multiple Integrals: Double integrals in Cartesian &polar coordinates, Change of order of integration, Triple integrals, Change of variables (Cartesian to Polar, Cartesian to Cylindrical & Cartesian to Spherical polar coordinate systems). **Applications:** Area enclosed by plane curves, Volume of solids.

UNIT II: Vector Calculus:

Vector Differentiation: Introduction, Scalar and Vector point functions, Del applied to scalar point functions-Gradient, Del applied to vector point functions-Div& Curl, Del applied twice to point functions, Del applied to products of point functions (Identities without proofs).

Vector Integration: Line integral, Green's theorem in the plane (without proof), Surface integrals, Stokes theorem (without proof), Volume integral, Gauss Divergence theorem (without proof).

UNIT III: Fourier Series:

Euler's formulae(without proof), Conditions of a Fourier expansion, Functions having points of discontinuity.Change of interval, Even and odd functions, Half-range series.

UNIT IV: Fourier Transforms:

Fourier Integral, Fourier cosine & sine integral, complex forms of Fourier integral.

Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms(without proof), Convolution theorem(without proof), finite Fourier sine & cosine transforms.

UNIT V: Applications of Partial Differential Equations:

Definition of PDE, Classification of 2nd order PDE, Variable separable method, Vibrations of a stretched string – Wave equation.One-dimensional heat flow, Two-dimensional heat flow, Solution of Laplace's equation.

Text Books:

1. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition, 2014.
2. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
2. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

APPLIED CHEMISTRY

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

COURSE OUTCOMES:

1:Study of polymers and composite materials enable us to use them in a good number of engineering fields

2: Industries are run by the quality of fuels and energy crisis can be met by broad understanding of different fuels

3: Electrochemical principles form the basis of batteries that are being developed. Destruction of metals and alloys can be prevented by understanding the science of corrosion.

4:Study of the existing developed materials forms a basis for developing more number of advanced materials

5: Methods of purification of water can be known so that more of them can be developed

6:The importance of engineering materials in the domestic and engineering fields can be understood.

SYLLABUS:

UNIT I: POLYMERS AND PLASTICS

Introduction- Degree of polymerization-functionality-tacticity-Types- Addition polymerization-Definition-PVC-Properties-applications condensation polymerization-Bakelite-Properties-applications,Physical and mechanical properties – Conducting polymers– Biodegradable polymers-applications– Natural rubber- Disadvantages - Compounding of rubber - vulcanization – Synthetic rubber: Thiokol -Thermoplastics and Thermosetting plastics –- Composite materials & Fiber reinforced plastics

UNIT II: BASICS OF ELECTRO CHEMISTRY AND CORROSION

Galvanic cell - Electro chemical series - Standard electrodes (Hydrogen and Calomel electrodes)

Primary cells: Zinc – air cellSecondary cells:- Lithium ion batteries, Pb-acid cell,

Fuel cells:- H_2-O_2 fuel cell and molten carbonate fuel cells

Corrosion:Dry Corrosion– Wet (Electrochemical) Corrosion –Factors influencing the rate of corrosion – Protection from corrosion – Cathodic protection – Electro plating -Electroless plating

UNIT III: NON CONVENTIONAL ENERGY SOURCES

Solar Energy:- Introduction, application of solar energy, conversion of solar energy

(Thermal conversion & photo conversion) – photovoltaic cell: design, working and its importance

Non-conventional energy sources:

(i) Hydropower include setup a hydropower plant (schematic diagram)

(ii) Geothermal energy: Introduction-schematic diagram of a geothermal power plant

(iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level.

(iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open cycle OTEC, hybrid OTEC, schematic diagram and explanation.

(v) Biomass and biofuels

UNIT IV: SEMICONDUCTORS AND SUPER CONDUCTORS

Non –Elemental Semi conductors: Stoichiometric, Non- Stoichiometric ,Controlled valency&Chalcogen photo/semiconductors- Preparation of Semiconductors Ge & Si by crystal pulling technique – purification by Zone refining.

Semiconductor Devices:- Diode –Transistor.

Super conductors*:*-Definition-Types- Characteristics –applications

UNIT V: ADVANCED MATERIALS AND GREEN CHEMISTRY

Nano materials*:*-Introduction –General methods of preparation (top down and bottom up)

Liquid Crystals-Definition, classification,applications

Green synthesis:-Introduction- Principles - methods of synthesis– alternative reactive media (aqueous phase method) and alternative energy sources(microwave method) -R4M4 principles-Econoburette.

SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

UV Spectroscopy- Basic principle-Instrumentation- ApplicationsIR Spectroscopy- Basic principle-Instrumentation- ApplicationsNMR Spectroscopy- Basic principle-Instrumentation- Applications

Analytical techniques: FE-SEM,TEM,BETChromatography techniques: Paper chromatography, Thin layer chromatography- applications

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM

Biology for Engineers

I Year – II Semester

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

Prerequisites: -

COURSE OUTCOMES:

After studying the course, the student will be able to:

1: Understand how biological observations lead to major discoveries and the morphological,Biochemical and ecological classification of organisms.

2:Understand that all forms of life have the same building blocks and their involvement in the Maintenance and metabolic processes of living organisms.

3:Classify enzymes and distinguish between different mechanisms of enzyme action andStudy the chemical reactions that are catalyzed by enzymes. Apply thermodynamic, Principles to biological systems and able to understand major chemical processes that occur, Within a living organism in order to maintain life.

4: Identify DNA as a genetic material in the molecular basis of information transfer.

5: Identify and classify microorganisms, understand media compositions and growth of Microorganisms

SYLLABUS:

Unit-1: Introduction

Importance and need of biology- Discoveries of biology in 18th Century: Brownian motion and the origin of thermodynamics- their importance in any scientific inquiry.

Classification of organisms based on (a) Cellularity- Unicellular or Multicellular , (b) Ultra structure- prokaryotes or eucaryotes. (c) Energy and carbon utilization -autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitat- acquatic or terrestrial (f) Molecular taxonomy- three major kingdoms of life.

Unit-2: Biomolecules

Introduction to molecules of life-monomeric units and polymeric structures of carbohydrates, Sugars, starch and cellulose, amino acids and proteins structure and function.

Nucleotides and DNA/RNA, Hierarchy of DNA Structure- from single stranded to double helix, two carbon units and lipids.

Unit-3: Enzymes & Metabolism

Enzyme classification, mechanism of enzyme action, enzyme kinetics and kinetic parameters.\

Thermodynamics as applied to biological systems, endergonic and exergoinc reactions, Concept of kinetic equilibrium and its relation to standard free energy Spontaneity, ATP as an energy currency, Glycolysis, Krebs cycle and Energy yielding and energy consuming reactions.

Unit-4: Information Transfer

Concept of genetic code, Molecular basis of information transfer; Transcription and translation.

Unit-5: Microbiology

Concept of species and strains, Identification of Micro organisms.

Sterilization and media compositions, Growth kinetics.

Text/Reference Books:

1) Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd

2) Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons

3) Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company

4) Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher

5) Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers

Basic Electrical & Electronics Engineering

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

Unit – I: Electric Circuits

Basic definitions, Types of network elements & sources, Ohms law, Kirchhoff's laws, Series & parallel circuits.Source transformation, Network reduction reductions, Introduction to AC circuits.

Unit – II: Electrical Machines

Basic laws – Faraday's laws of electromagnetic induction, Lenz's law, Right hand thumb rule, Fleming's left hand and right hand rules,Construction, working principle and applications of DC machinesConstruction, working principle and applications of transformers, induction motor and synchronous machines.

Unit – III: Electrical Power Generation, Transmission and Distribution

Sources of Energy – conventional & non conventional, Introduction and layout of thermal, hydel power plants, Introduction and layout of nuclear power plants, solar power plants, Concepts of power transmission and distribution using single line diagram.

Unit – IV: Electrical Installations & Safety

Components of Switchgear – fuse, MCBs, types of wires & cables, earthing, different types of batteries, Elementary calculations for energy consumption and types of tariffs. Energy Conservation.Electric shock and first aid, Hazardous areas, General principles of electric safety.

Unit – V: Basic Electronic Devices and their applications

Introduction to semi-conductor physics, PN junction diode, Zener diode, Transistor - operation, characteristics and configurations, Operation of transistor as a switch. Half wave, full wave and bridge rectifier using diodes, types of filters, Zener diode as a voltage regulator, transistor as an amplifier. introduction to feed back amplifiers.

Text Books:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA McGrawHill, Second Edition

Data Structures through C

I Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 4	Tutorial: 1	External Marks: 70

Prerequisites: Problem Solving Approaches

SYLLABUS:

UNIT - I:

Sortings: Bubble sort, Insertion sort, section sort

Searching: linear search, binary search

UNIT II:

Pointers: Introduction, Pointer Arithmetic and Arrays, Memory Allocations Functions ,Compatibility, Lvalue and Rvalue, Arrays and Pointers, Passing an Array to a Function, , Array of Pointers. Pointers For Inter Function Communications, Pointers to Pointers

UNIT III:

Structures: Structure Type Declaration, Initialization, Accessing Structures, Operations on Structures, Complex Structures, Structures and Functions, Sending the Whole Structure, Passing Structures through Pointers.

Unions: Referencing Unions, Initializers, Unions and Structures, Applications.

Text Input/output: Files, Streams, Standard Library Input/Output Functions, Formatting Input/output Functions and Character Input/Output Functions, Command-Line Arguments.

UNIT IV:

Stacks: Definition, Representing stacks, ADT Stack and its operations: Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms. Recursion, Towers of Hanoi problem.

Queues: Queue and its Sequential Representation, Queue as an abstract data type, Types of Queue: Simple Queue, Circular Queue, Operations on each types of Queues: Algorithms.

UNIT V:

Linked lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; **Doubly linked list:** operations and algorithms.

Circular Linked Lists: all operations their algorithms, Linked representation of Stack and Queue. Polynomials: Addition, Multiplication.

TEXT BOOKS:

[1] ReemaThareja, "Computer Fundamentals and C Programming", Oxford, 2012

[2] Mark Allen Weiss,"Data structure and Algorithm Analysis in C". Addison Wesley Publication.2006.

[3] SEYMOUR LIPSCHUTZ, "Data Structures With C – by Schaum Series".

REFERENCE BOOKS:

[1] Horowitz Sahni and Anderson-Freed "Fundamentals of Data Structures in C". 2nd Edition, Universities Press,2008.

[2] Richard F. Gilberg& B. A. Forouzan "Data Structures A Pseudocode Approcah with C", Second Edition, CENGAGELearning.

Applied chemistry laboratory

I Year – II Semester

Lecture: 0	Practical: 3	Internal Marks: 40
Credits: 1.5	Tutorial: 0	External Marks: 60

Prerequisites: -

List of Experiments:

S.No	Name of the Experiment
1	Introduction to chemistry laboratory
2	Determination of HCl using standard Na_2CO_3 solutions
3	Determination of alkalinity of a sample containing Na2CO3 and NaOH.
4	Determination of temporary and permanent hardness of water using standard EDTA solution.
5	Determination of Copper using standard EDTA solution
6	Determination of ferrous iron using standard $K_2Cr_2O_7$ solution
7	Determination of $KMnO_4$ using standard Oxalic acid solution
8	Determination of pH of the given sample solution using pH meter
9	Conductometric Titrations between strong acid and strong base
10	Potentiometric Titrations between strong acid and strong base
11	Synthesis of Phenol-Formaldehyde resin
12	Synthesis of Urea-Formaldehyde resin
13	Determination of Surface tension of a liquid
14	Determination of Viscosity of a liquid
15	Determination of Flash and Fire point of a lubricant
16	Determination of Cloud and Pour point of a lubricant
17	Determination of Aniline point of a lubricant

Data Structures through C Lab

I Year – II Semester

Lecture: 0 Practical: 3 Internal Marks: 40

Credits: 1.5 Tutorial: 0 External Marks: 60

Prerequisites: C Programming

List of Experiments

1. Write C programs to sort the list of elements using followingtechniques
   a. Bubble Sortb. InsertionSortc. SelectionSort
2. Write C programs to search for an element in an array using following techniques
   a. LinearSearchb. BinarySearch
3. Write a C program to demonstrate call by value and call byreference
4. Write a C program to display student information usingstructures
5. Write a C program to count number of lines, words and characters in a file
6. Write a C program to perform stack operations usingarrays
7. Write a C program to perform queue operations usingarrays
8. Write C program to implement stackapplications.
   a. Conversion of Infix expression to postfixexpression
   b. Evaluation of postfixexpression c. Towers ofHanoi
9. Write a C program to perform circular queue operations usingarrays
10. Write a C program to implement following operations on Single Linked List
    a. Insertion b. Deletionc. Search
11. Write a C program to implement following operations on DoubleLinked List
    a. Insertion b. Deletionc.Search
12. Write a C program to implement stack operations using linkedlist
13. Write a C program to implement queue operations using linkedlist
14. Write a C program to add two polynomials using linkedlist
15. Write a C program to multiply two polynomials using linkedlist

ENVIRONMENTAL STUDIES

I Year – II Semester

Lecture: 2 Practical: 0 Internal Marks: 30

Credits: 0 Tutorial: 0 External Marks: 70

Prerequisites: -

COURSE OUTCOMES:

1. The importance of environment, Natural resources and current global environmental challenges for the sustenance of the life on planet earth.
2. The concepts of the ecosystem and its function in the environment.
3.The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
4. The various attributes of the pollution and their impacts and measures to reduce or controlthe pollution along with waste management practices.
5. The environmental legislations of India and Social issues and the possible means
6. Environmental assessment and the stages involved in EIA.

SYLLABUS:

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope ofEnvironmental Studies- Importance of Environmental Studies- Need for public awareness,Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference,Earth summit

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest ecosystem- Grassland ecosystem ,Desert ecosystem- Aquatic ecosystem: pond ,lake ecosystem- Streams ,river ecosystem, Oceans

UNIT-II :NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources-Forest resources**:** Use and over-exploitation - Deforestation-Timber extraction-Mining- Conservation-Water resources**:** Use and over utilization

of surface and ground water,- Floods, drought, Dams and associated problems- Water conservation, rain water harvesting, water shed management-Energy resources**:** renewable energy sources –solar-wind-hydro-tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels- Hydrogen.- Non-renewable energy sources-coal-petroleum-natural gas-Nuclear energy

UNIT-III: **BIODIVERSITY AND ITS CONSERVATION**

Definition, classification- Value of biodiversity-Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India-Conservation of biodiversity- Biodiversity at national and local levels, Hot-sports of biodiversity

UNIT-IV:ENVIRONMENTAL PROBLEMS

Global warming,Climate change- Acid rain , Ozone depletion- Air pollution- Water pollution- Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects,control measures- Pollution case studies- Role of an individual in prevention of pollution

UNIT-V: ENVIRONMENTALLEGISLATION&MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks- Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks- Environmental Impact Assessment and its significance- Preparation of EnvirronmentalManagement Plan and Environmental Impact Statement- Ecotourism

TEXT BOOKS:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, New Delhi
2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
4.Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCE:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

II YEAR SEMESTER-I SYLLABUS

PROBABILITY AND STATISTICS

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Prerequisites: -

SYLLABUS:

UNIT I: Discrete Random variables and Distributions:

Introduction-Random variables- Discrete Random variable-Distribution function-Expectation-Moment Generating function-Moments and properties.Discrete distributions: Binomial and Poisson distributions.

UNIT II: Continuous Random variable and distributions:

Introduction-Continuous Random variable-Distribution function- Expectation-MomentGenerating function-Moments and properties.Continuous distribution: Normal distributions, Normalapproximation to Binomial distribution.

UNIT III: Sampling Theory:

Introduction - Population and samples- Sampling distribution of means (s known)-Centrallimit theorem- t-distribution- Sampling distribution of means (s unknown)- Samplingdistribution of variances -χ^2 and F-distributions- Point estimation- Maximum error ofestimate - Interval estimation.

UNIT IV: Tests of Hypothesis:

Introduction –Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors –Levelof significance - One tail and two-tail tests- Tests concerning one mean and proportion, twomeans-Proportions and their differences- ANOVA for one-way and two-way classified data.

UNIT V: Curve fitting and Correlation:

Introduction - Fitting a straight line –Second degree curve-exponential curve-power curve bymethod of least squares-Goodness of fit.Correlation and Regression – Properties.

Text Books:

1. **Richards A Johnson, Irvin Miller and Johnson E Freund**. Probability and Statistics for Engineering, 9th Edition, PHI.

2. **Jay l.devore,** Probability and Statistics for Engineering and the Sciences, 8th edition, Cengage.

Reference Books:

1. **ShronL.Myers, Keying Ye, Ronald E Walpole,** Probability and StatisticsEngineers and the Scientists,8th Edition, Pearson 2007.

2. **William Menden Hall, Robert J. Bever and Barbara Bever**, Introduction toprobability and statistics, Cengage learning, 2009.

OBJECT ORIENTED PROGRAMMING

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Understand the principles of object oriented concepts. Define classes and objects by identifying real world entities, their properties and functionalities.
2. Reuse the existing classes by using inheritance and understand the concepts of packages and exception handling.
3. Make use of built-in classes in Java and understand the concept of thread.
4. Develop user interfaces using applets, AWT and Event handling in java.
5. Create portable GUI applictions using Swing components.

SYLLABUS:

UNIT-I:

Introduction to OOP, procedural programming language vs object oriented language, principles of OOP, applications of OOP, history of java, java features, JVM. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.

Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector.

UNIT-II:

Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java.lang package, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

Exception handling, importance of try, catch, throw, throws and finally block, userdefined exceptions, Assertions.

UNIT-III:

Multithreading: Introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file.

UNIT-IV: Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling: event delegation model, sources of event, Event Listeners, adapter classes, inner classes.

UNIT-V:

AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List, Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

Swing: Introduction, JFrame, JApplet, JPanel, Componets in Swings, Layout Managers in Swings, JList and JScrollPane, Split Pane, JTabbedPane, JTree, JTable, Dialog Box.

TEXT BOOKS:

1. The complete Reference Java, 8th edition, Herbert Schildt, TMH.
2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford.
3. JAVA for Beginners,4e,JoyceFarrell,Ankit R. Bhavsar,Cengage Learning.
4. Object oriented programming with JAVA,Essentials and Applications, Raj Kumar Bhuyya,Selvi,Chu,TMH.
5. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.

REFERENCE BOOKS:

1.JavaProgramming,K.Rajkumar.Pearson
2.CoreJava,BlackBook,RNageswararao,Wiley,Dream Tech
3.Core Java for Beginners,RashmiKantaDas,vikas.
4.Object Oriented Programming Through java, P.Radha Krishna, Universities Press

ADVANCED DATA STRUCTURES

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: Data Structures

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Create hash based index for efficient search
2. Analyze the efficiency of various tree data structures
3. Understand the concept of priority queues and its applications
4. Implement tree data structures for multi-way search
5. Identify and implement shortest path in various real time problems.

SYLLABUS:

UNIT-I:

SORTING: Quick Sort, Merge Sort, External Sorting, Introduction, K-way Merging - Buffer Handling for parallel Operation.

HASHING : Introduction-Static Hashing- Hash Table- Hash Functions- Secure Hash Function- Overflow Handling- Theoretical Evaluation of Overflow Techniques

UNIT-II: TREES

Introduction, Terminology, Representation of Trees, Binary Trees, Properties of Binary Tress, Binary Tree Representations, Tree Traversal: Inorder Traversal, Preorder Traversal, Postorder Traversal, Binary Search Trees, Definition, Searching a Binary Search Tree, Insertion into a Binary Search Tree, Deletion from a Binary Search Tree, Height of Binary Search Tree, AVL Trees, Insertions and Deletions.

UNIT-III: PRIORITY QUEUES (HEAPS)

Model, Simple Implementation, Binary Heap-Structure Property-Heap-Order Property-Basic Heap Operations- Other Heap Operation, Applications of Priority Queues- The Selection Problem Event Simulation Problem, Binomial Queues- Binomial Queue Structure – Binomial Queue Operation-Implementation of Binomial Queues

UNIT-IV: MULTIWAY SEARCH TREES

M-Way Search Trees, Definition and Properties- Searching an M-Way Search Tree, B-Trees, Definition and Properties- Number of Elements in a B-tree- Insertion into B-Tree- Deletion from a B-Tree- B+-Tree Definition- Searching a B+-Tree- Insertion into B+-tree- Deletion from a B+-Tree.

UNIT-V: GRAPHS

Introduction, Definition, Graph Representation, Elementary Graph Operation, Depth First Search, Breadth First Search, Connected Components, SpanningTrees, Minimum Cost Spanning Trees, Kruskal'S Algorithm, Prim'sAlgorithm,Sollin's Algorithm, Dijkstra's Algorithm

TEXT BOOKS:

1. Data Structures, a Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan,Cengage.

2. Fundamentals of DATA STRUCTURES in C: 2nded, , Horowitz , Sahani, Andersonfreed,UniversitiesPress

3. Data structures and Algorithm Analysis in C, 2nd edition, Mark Allen Weiss, Pearson

REFERENCE BOOKS:

1. Web : http://lcm.csa.iisc.ernet.in/dsa/dsa.html

2. http://utubersity.com/?page_id=878

3. http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures

4. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms

5. File Structures :An Object oriented approach with C++, 3ed, Michel J Folk, Greg Riccardi, BillZoellick

DIGITAL LOGIC DESIGN

IIYear – I Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Apply Boolean laws & theorems to digital Logic functions; simplify the Boolean functions to the minimum number of literals
2. Design different types of combinational logic circuits using Adders, Subtractors, Decoders, Multiplexers and Magnitude Comparators.
3. Design clocked sequential logic circuits using flip flops
4. Design different types of Counters, Registers.
5. Contrast Programmable logic devices(PROM, PAL, and PLA) and its design.

SYLLABUS:

UNIT I:

Number Systems and Codes: Decimal, Binary, Octal, Hexadecimal Number systems and their conversions, Complements: r's complement, (r-1)'s complement, Arithmetic additions, subtraction using the method of complements. Codes: BCD, Excess 3, Gray codes.

Boolean algebra And Logic Gates:

Digital computers and digital systems, Basic theorems and Properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms, Digital Logic Gates, Universal gates, Canonical and standard forms, simplification of Boolean

Functions using K maps (up to five variables), Don't-Care conditions, Tabulation method, Two level NAND and NOR implementations.

UNIT II:

Combinational Logic:

Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure. Exclusive-or Gates, Parity Generators and Checkers.

Combinational Logic with MSI and LSI: Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Demultiplexers, Encoders, Multiplexers, Code Conversion.

UNIT III :

Sequential Logic: Sequential circuits, Classification, Latches, Flip Flops, Triggering of Flip-Flops, Master slave flip-flop, Flip-Flop Excitation tables, flip-flop direct inputs.

Analysis of Clocked Sequential Circuits: State table, State diagram, state equations, State Reduction and Assignment, Design Procedure, design with unused states, Design of Counters.

UNIT IV:

Registers: Register, Left Shift register, Right shift register, Bidirectional Shift register, Universal Shift register.

Counters: Design of Synchronous counters, Ripple counters, Up/Down counters, Ring counter, Johnson counter.

UNIT V:

Programmable Logic & Clock Circuits: Read – Only Memory (ROM), PROM, Programmable Logic Device (PLD), Programmable Logic Array (PLA), Programmable Array Logic (PAL), 555 timer, Astable and Monostable operations.

TEXT BOOKS

1.M.Morris Mano, Digital Logic & Computer Design 1 e/d reprint, Pearson education, 2013.
2. Roth ,Fundamentals of Logic Design, Cengage,5/e.

REFERENCE BOOKS:

1. Donald e Givone, Digital Principles and Design, TMH.
2. A.AnandKumar ,Fundamentals of Digital Circuits,4th Edition,PHI
3. ZviKohavi, Switching and Finite Automata Theory, 2nd Edition, TMH, 1978.

Humanities-I: Effective Technical Communication

II Year – I Semester

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

SYLLABUS:

UNIT-I: Vocabulary Building

The concept of word formation
Root words from foreign languages and their use in English
Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives
Synonyms, antonyms and standard abbreviations

UNIT-II: Writing Skills

Sentence structures
Use of phrases and clauses in sentences
Importance of proper punctuation
Creating coherence
Organizing principles of paragraphs in documents
Comprehension
Essay writing

UNIT-III: Identifying Common Errors in Writing

Subject-verb agreement
Noun-Pronoun agreement
Misplaced Modifiers
Articles
Prepositions
Redundancies
Clichés

UNIT-IV: Oral Communication

Common Everyday situations: Conversations and Dialogues
Communication at workplace
Interviews
Formal Presentations

UNITV: Life Skills

Self-assessment and self esteem
Attitudes, values and beliefs
Personal goal setting
Career planning
Managing Time
Complex Problem solving
Creativity

Suggested Readings:

1. Practical English usage, Michael Swan, OUP 1995
2. Remedial English Grammar, F.T.Wood.Macmillan, 2007
3. On writing well. William Zinsser, Harper Resource book, 2001
4. Study Writing, Liz-Hamp-Lyons and Ben Heasly, Cambridge University Press, 2006
5. Communication Skills, Sanjay Kumar and Pushp Latha, Oxford University press, 2011
6. Exercises in spoken English parts I-III, CIEFL, Hyderabad Oxford university press

OBJECT ORIENTED PROGRAMMING LAB

II Year – I Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES: -

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Understand the behavior of primitive data types, object references, and arrays.
2. Implement Java classes from specifications
3. Implement interfaces, inheritance, and polymorphism as programming techniques
4. Apply exceptions handling.

LIST OF LAB EXPERIMENTS:

Exercise - 1 (Basics)

a). Write a JAVA program to display default value of all primitive data type of JAVA

b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

b). Write a JAVA program to sort for an element in a given list of elements using bubble sort

(c). Write a JAVA program to sort for an element in a given list of elements using merge sort.

(d) Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3 (Class, Objects)

a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.

b). Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

a). Write a JAVA program to implement constructor overloading.

b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)

a). Write a JAVA program to implement Single Inheritance.

b). Write a JAVA program to implement multi level Inheritance.

c). Write a java program showing the usage of abstract class.

Exercise - 6 (Inheritance - Continued)

a). Write a JAVA program give example for "super" keyword.

b). Write a JAVA program to implement Interface.

Exercise - 7 (Exception)

a).Write a JAVA program that describes exception handling mechanism

b).Write a JAVA program Illustrating Multiple catch clauses.

Exercise – 8 (Runtime Polymorphism)

a). Write a JAVA program that implements Runtime polymorphism

Exercise – 9 (Exception)

a). Write a JAVA program Illustrating exception handling keywords.

b). Write a JAVA program for creation of Java Built-in Exceptions

c).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a). Write a JAVA program that creates threads by extending Thread class.

b). Write a program illustrating **isAlive**and **join ()**

c). Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

a).Write a JAVA program Producer Consumer Problem

b).Write a case study on thread Synchronization after solving the above producer consumer problem.

Exercise – 12 (Packages)

a). Write a JAVA program illustrate class path

b). Write a case study on including in class path in your os environment of your package.

c). Write a JAVA program that import and use your package in the previous Problem.

Exercise - 13 (Applet)

a).Write a JAVA program to paint like paint brush in applet.

b). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)

a).Write a JAVA program that display the x and y position of the cursor movement using Mouse.

b).Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

ADVANCED DATA STRUCTURES LAB

II Year – I Semester

Lecture: 0 Practical: 4 Internal Marks: 40

Credits: 2 Tutorial: 0 External Marks: 60

PREREQUISITES: Data Structures, C/C++ programming

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Develop indices.
2. Implement various search trees.
3. Crate a graph and traverse the graph
4. Develop code for shortest path problems.

LIST OF LAB EXPERIMENTS:

1 To implementation of Quick Sort
2 To implementation of Merge Sort
3 To implementation of Static Hashing (Use Linear probing for collision resolution)
4 To implementation of Binary Search trees.
5 To perform various operations i.e., insertions and deletions on AVL trees.
6 To implement operations on binary heap.
7 To implement operations on graphs
   i) vertex insertion
   ii) Vertex deletion
   iii) finding vertex
   iv)Edge addition and deletion
8 To implementation of Breadth First Search Techniques.
9 To implementation of Depth First Search Techniques.
10 To implement Prim's algorithm to generate a min-cost spanning tree.
11 To implement Krushkal's algorithm to generate a min-cost spanning tree.
12 To implement Dijkstra's algorithm to find shortest path in the graph.

R PROGRAMMING LAB

II Year – I Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES: -

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Implement the basic concepts and data structures of R.
2. Implement loops and functions in R
3. Implement mathematical functions and handling files
4. Apply the different distributions
5. Use various graphical tools in R
6. Describe the properties of discrete and continuous distribution functions

Concepts to be covered:

Introduction, How to run R, R Programming Structures, Control Statements, Loops, , Functions, Recursion, Doing Math and Simulation in R, Input /output, Accessing the Keyboard and Monitor, Reading and writer Files, Creating Graphs, Saving Graphs to Files, Probability Distributions, Correlation and Covariance, Linear Models.

LIST OF EXPERIMENTS:

Exercise 1: Introduction to R Programming

Exercise 2: Getting Used to R: working with Data structures

Exercise 3: Using Conditional & Iterative Statements in R

Exercise 4: Working with functions

Exercise 5: Doing Math and Simulation in R

- Math Functions
- Calculus
- Linear algebraic operations
- Set operations

Exercise 6: Reading in Your Own Data

- Working with files
- Accessing the Keyboard and Monitor,

Exercise 7: Data visualization

- Charts and plots
  - Find the mean, median, standard deviation and quintiles of a set of observations.
- Students may experiment with real as well as artificial data sets.

Exercise 8: Probability Distributions.

- Generate and Visualize Discrete and continuous distributions using the statistical environment. Demonstration of Normal, binomial and Poisson distributions.
- Students are expected to generate artificial data using and explore various distribution and its properties. Various parameter changes may be studied.

Exercise 9: Correlation

Calculate the correlation between two variables.
Use the scatter plot to investigate the relationship between two variables

Exercise 10: Fitting a straight line of type y=a+bx

- A Statistical Model for a Linear Relationship
- The R Function: lm

TEXT BOOKS:

1) Statistical Learning using R, WHITTON

2) The Art of R Programming, A K Verma, Cengage Learning.

3) R for Everyone, Lander, Pearson

4) The Art of R Programming, Norman Matloff, No starch Press.

REFERENCES:

1) R Cookbook, Paul Teetor, Oreilly.

2) R in Action, Rob Kabacoff, Manning

Constitution of India

II Year – I Semester

Lecture: 2	Practical: 0	Internal Marks: -
Credits: 0	Tutorial: 0	External Marks: -

PREREQUISITES: -

COURSE OUTCOMES:

At the end of the course, the student will be able to have a clear knowledge on the following:

1. Know the sources, features and principles of Indian Constitution.
2. Learn about Union Government, State government and its administration.
3. Get acquainted with Local administration and Pachayati Raj.
4. Be aware of basic concepts and developments of Human Rights.
5. Gain knowledge on roles and functioning of Election Commission

SYLLABUS:

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT-IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level

Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. SubashKashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. J. Raj Indian Government and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-RESOURCES:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

Technical Seminar

II Year – I Semester

Lecture: 1	Practical: 0	Internal Marks: -
Credits: 1	Tutorial: 0	External Marks: -

The Student Shall give a detailed presentation of any technical topic in the domain of Computer Science and Engineering which shall be evaluated by the Department committee.

II YEAR SEMESTER-II SYLLABUS

Discrete Mathematics

II Year – II Semester

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

SYLLABUS:

UNIT-I

Mathematical Logic: Introduction, Statements and Notation, Connectives, Normal forms, Theory of inference for Statement Calculus, The Predicate Calculus, Inference theory of Predicate calculus.

UNIT-II

Set Theory: Introduction, Basic concepts of set theory, Principle of Inclusion and Exclusion, Properties of Binary relations, Relation matrix and Digraph, operations on relations, Partition and covering, Transitive closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams, Bijective functions, Inverse functions, Composition of functions, Recursive functions, Pigeonhole principle and its applications.

UNIT-III

Algebraic Structures: Algebraic systems and examples, general properties, semigroup, monoid, groups and subgroups.

Number Theory: Properties of integers, Division algorithm, The greatest common divisor, Euclidean algorithm (without proof), Least common multiple, testing of prime numbers, The fundamental theorem of Arithmetic, Fermat's theorem and Euler's theorem (without proofs) and its applications.

UNIT-IV

Combinatorics and Recurrence Relations: Basic counting principles- sum rule, solving recurrence relations by substitution and by the method of characteristic roots.

UNIT -V:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems withoutProofs).

TEXT BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblayand P. Manohar, Tata McGraw Hill
3. Mathematical Foundation for Computer science, S. Santha, E.V. Prasad, Cengage publications.

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REFERENCE BOOKS:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H.Rosen, 7th Edition, Tata McGraw Hill.
2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler

Ross, PHI. 3. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.

DATA BASE MANAGEMENT SYSTEMS

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Describe a database and different database models
2. Design Entity Relationship models And Relational Model
3. Design and implement queries using Structured Query Language
4. Design database schema using normalization.
5. Understand the characteristics of database transaction management.

SYLLABUS:

Unit – I:

Introduction: Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Data base systems, and Database applications.

Brief introduction of different Data Models- the ER Model – Relational Model – Other Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure.

Unit – II:

Entity Relationship Model: Introduction, Representation Of Entities, Attributes, Entity Set, Relationship, Relationship Set, Constraints, Sub Classes, Super Class, Inheritance, Specialization, And Generalization Using ER Diagrams.

Relational Model: Introduction to Relational Model, Concepts of Domain, Attribute, Tuple, Relation, Importance Of Null Values, Constraints (Domain, Key Constraints, Integrity Constraints) And Their Importance

Unit – III:

SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause,

arithmetic & logical operations, SQL functions (Date and Time, Numeric, String conversion), Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering.

Implementation of different types of joins, view(updatable and non-updatable), relational set operations, Definition of NOSQL, History of NOSQL and Different NOSQL products, Applications, features of NoSQL, Difference between SQL and NoSQL

Unit-IV

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

Indexing: Hashing, single and multi-level indexes, dynamic multilevel indexing using B-Tree and B+ tree, index on multiple keys.

Unit-V

Transaction Management And Concurrency Control: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint, Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods: lock granularity, lock types, two-phase locking for ensuring serializability, deadlocks.

Recovery System: Introduction to ARIE, The Log, The Write-Ahead Log Protocol, check pointing, Recovery from system crash

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, *"Data base Management Systems"*, 3rd Edition, TATA McGrawHill, 2008.

2. Silberschatz, Korth, *"Data base System Concepts"*, 6th Edition, McGraw Hill, 2010.

3. C.J.Date, "*Introduction to Database Systems"*, 7th Edition, Pearson Education, 2002.

4. Professional NOSQL" by Shashank Tiwari, 2011, WROX Press.

REFERENCES:

1. Peter Rob & Carlos Coronel, *"Data base Systems design, Implementation, and Management"*, 7th Edition, Pearson Education, 2000.

2. ElmasriNavrate, *"Fundamentals of Database Systems"*, 5th Edition, Pearson Education, 2007.

COMPUTER ORGANIZATION & ARCHITECTURE

II Year – II Semester

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

PREREQUISITES: -DLD

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Understand the architecture of a modern computer with its various processing units.

2. Understand RTL, micro operations, instruction cycle

3. Understand the features of hardwired and micro programmed control units.

4. Analyze the memory hierarchy system and performance improvement by cache memory.

5. Analyze the communication methods of I/O devices and standard I/O interfaces.

SYLLABUS:

UNIT I:

Basic Structure of Computers: Computer Types, Functional unit, Basic Operational concepts, Bus structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating – Point Representation. Other Binary Codes, Error Detection codes. Performance, The history of computer development.

UNIT II:

Register Transfer Language And Micro Operations: Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shiftmicro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Register, Computer instructions, Timing and control, Instruction cycle, Memory – Reference Instructions. Input – Output and Interrupt.

UNIT III :

Central Processing Unit: Stack Organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation Instructions, Program control Instructions.

Control Unit: Control Memory, Hard wired control, Micro programmed control and Micro Instruction Format, Address Sequencing, Design of Control Unit.

UNIT IV:

Memory Organization:

Memory Hierarchy, Primary Memory, Introduction to Secondary Memory, Associative Memory, Cache Memory, virtual Memory, Memory Management hardware.

UNIT V:

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access, IOP, Serial Communication.

TEXT BOOKS

1.M.Morris Mano, ―Computer Systems Architecture, Pearson Education publishers, 3rd edition.
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky, ―Computer Organization, TMH publications, 5th edition, 2002.

REFERENCE BOOKS:

1. William Stallings, ―Computer Organization and Architecture, Pearson/PHI publishers, 6th edition, 2004.
2. Andrew S. Tanenbaum, ―Structured Computer Organization, Pearson/PHI publishers, 4th edition, 2005.
3.John D Carpinelli, ―Computer Systems Organization and Architecture‖, Pearson Education, 1st edition, 2001

OPERATING SYSTEMS

II Year – II Semester

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1.Understand the functionalities of an operating system and Evaluate different CPU scheduling algorithms.

2. Apply synchronization to cooperating processes and handle the deadlocks

3. Learn various management techniques for efficient utilization of system memory.

4. Understand and analyze theory andimplementation offiles and Evaluate different disk scheduling algorithms.

5. Analyze the functionalities in various operating systems.

SYLLABUS:

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

Process Management – Process concept, the process, Process State Diagram, Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Inter process Communication, Scheduling-Basic Concepts, Scheduling Criteria, and Scheduling Algorithms.

UNIT-II:

Concurrency: Process Synchronization, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-III:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT V:

Linux System: Components of LINUX, Inter process Communication, Synchronization, Interrupt, Exception and System Call.

Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.

2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.

2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.

3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

Managerial Economics & Financial Analysis

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

COURSE OUTCOMES:

At the end of this course the student will able to:

- The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand.
- One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs.
- One has to understand the nature of different markets and Price Output determination under various market conditions.
- One should equipped with the knowledge of different Business Units
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
- The Learner is able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

SYLLABUS

UNIT – I:

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Concepts of Demand-Types-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement- Demand forecasting and its Methods.

UNIT – II:

Production and Cost Analyses:

Production function-Isoquants and Isocosts-Law of Variable proportions- Cobb-Douglas Production function-Economics of Sale-Cost Concepts- Opportunity Cost-Fixed vs Variable Costs-Explicit Costs vs Implicit Costs-Out of Pocket Costs vs Imputed Costs-Cost Volume Profit analysis- Determination of Break-Even Point (Simple Problem).

UNIT – III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

UNIT – IV:

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader – Partnership – Joint Stock Company – State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

UNIT – V:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements- Analysis and Interpretation of Financial Statements

Capital Budgeting: Meaning of Capital Budgeting-Need for Capital Budgeting- Techniques of Capital Budgeting-Traditional and Modern Methods.

TEXT BOOKS :

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011.
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011.
3. Prof. J.V.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES :

1. V. Maheswari : Managerial Economics, Sultan Chand.
2. Suma Damodaran : Managerial Economics, Oxford 2011.
3. Dr. B. Kuberudu and Dr. T. V. Ramana : Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.
4. VanithaAgarwal : Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja : Financial Accounting for Managers, Pearson.
6. Maheswari : Financial Accounting, Vikas Publications.
7. S. A. Siddiqui & A. S. Siddiqui : Managerial Economics and Financial Analysis, New Age International Publishers, 2012.

PROFESSIONAL ETHICS

II Year – II Semester

Lecture: 3	Practical: 0	Internal Marks: 30
Credits: 3	Tutorial: 0	External Marks: 70

Course Objectives:

- To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
- Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

UNIT I: Principles for Harmony
Truthfulness – Customs and Traditions – Value Education – Human Dignity – Human Rights – Fundamental Duties – Aspirations and Harmony (I, We & Nature) – Gender Bias – Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.
UNIT II: Engineering Ethics and Social Experimentation:
History of Ethics – Need of Engineering Ethics – Senses of Engineering Ethics – Profession and Professionalism – Self Interest – Moral Autonomy – Utilitarianism – Virtue Theory – Uses of Ethical Theories – Deontology – Types of Inquiry – Kohlberg's Theory – Gilligan's Argument – Heinz's Dilemma – Comparison with Standard Experiments – Learning from the Past – Engineers as Mangers – Consultants and Leaders – Balanced Outlook on Law – Role of Codes – Codes and Experimental Nature of Engineering.
UNIT III: Engineers' Responsibilities towards Safety and Risk:
Concept of Safety – Safety and Risk – Types of Risks – Voluntary v/s Involuntary Risk – Consequences – Risk Assessment- Accountability- Liability – Reversible Effects – Threshold Levels of Risk – Delayed v/s Immediate Risk – Safety and the Engineer – Designing for Safety-Risk – Benefit Analysis- Accidents.
UNIT IV: Engineers' Duties and Rights:
Concept of Duty – Professional Duties- Collegiality- Techniques for Achieving Collegiality – Senses of Loyalty- Consensus and Controversy – Professional and Individual Rights – Confidential and Proprietary Information – Conflict of Interest – Ethical egoism – Collective Bargaining – Confidentiality – Gifts and Bribes – problem solving – Occupational Crimes – Industrial Espionage – Price Fixing – Whistle Blowing.
UNIT V: Global Issues:
Globalization and MNCs – Cross Culture Issues – Business Ethics – Media Ethics- Environmental Ethics – Endangering Lives – Bio Ethics – Computer Ethics – War Ethics – Research Ethics – Intellectual Property Rights.

Outcome:

- It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.

- It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger – Tata McGraw – Hill – 2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, Dharanikota Suyodhana – Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S.B.Gogate, Vikas Publishing House Pvt. Ltd., Noida.
6. Enginnering Ethics & Human Values by M.Govindarajan, S. Natarajan and V.S.Senthil Kumar – PHI Learning Pvt.Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M.Jayakumaran – University Science Press.
8. Professional Ethics and Human Values by Prof. D.R.Kiran – Tata McGraw – Hill – 2013.
9. Human Values and Professional Ethics by Jayshree Suresh and B.S. Raghavan, S.Chand Publications.

DATA BASE MANAGEMENT SYSTEMS LAB

II Year – II Semester

Lecture: 0	Practical: 4	Internal Marks: 40
Credits: 2	Tutorial: 0	External Marks: 60

PREREQUISITES: -

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Create own database.
2. Manipulate data in database using SQL language.
3. Experiment with various SQL queries with database created
4. Write programs using PL/SQL language.
5. Create triggers using PL/SQL.

LIST OF LAB EXPERIMENTS:

1. Introduction to SQL: DDL, DML, DCL, TCL.
2. Queries for Creating Tables with Constraints, Views.
3. Example SQL Queries using select.
4. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN).
5. Queries using Group By, Order By, and Having Clauses and Working with Index, Sequence, Synonym.
6. Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.
7. Queries on Joins and Correlated Sub-Queries.
8. Write a PL/SQL Code using Basic Variable, Anchored declarations, and Usage of Assignment Operation.
9. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL.
10. Write a PL/SQL block using SQL and Control Structures in PL/SQL.
11. Write a PL/SQL Code using Cursors, Exceptions and Triggers.
12. Write a PL/SQL Code using Procedures, Functions, and Packages.

TEXT BOOKS :

1) ORACLE PL/SQL by example. Benjamin Rosenzweig, ElenaSilvestrova, Pearson
2) ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, TMH.
3) SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.
4) Data Base Management System, Oracle SQL and PL/SQL, Pranabkumar Das Gupta, P Radha Krishna, PHI.

OPERATING SYSTEMS &LINUX PROGRAMMING LAB

II Year – II Semester

Lecture: 0 Practical: 4 Internal Marks: 40

Credits: 2 Tutorial: 0 External Marks: 60

PREREQUISITES: C programming

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Implement various basic functionalities of operating systems

2. Illustrate kernel functionalities using LINUX

LIST OF LAB EXPERIMENTS:

Operating Systems:

1. Simulate the following CPU scheduling algorithms: a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate Bankers Algorithm for Dead Lock Avoidance
3. Simulate Bankers Algorithm for Dead Lock Detection.
4. Simulate the placement algorithms in Multiprogramming
5. Simulate the following page replacement algorithms: a) FIFO b) LRU c) Optimal
6. Simulate the following File allocation strategies: a) Sequenced b) Indexed c) Linked

Linux Programming:

1. a) Study of Unix/Linux general purpose utility command list:man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.

   b) Study of vi editor.c) Study of Bash shell, Bourne shell and C shell in Unix operating system.

2. Write a C program that makes a copy of a file using standard I/O, and system calls
3. Write a C program to emulate the UNIX ls –l command.
4. Write a C program that illustrates how to execute two commands concurrently with a command pipe.Ex: - ls –l | sort
5. Write a C program that illustrates two processes communicating using shared memory
6. Write a C program to simulate producer and consumer problem using semaphores

7. Write C program to create a thread using pthreads library and let it run its function.
8. Write a C program to illustrate concurrent execution of threads using pthreads library.

PYTHON PROGRAMMING LAB

II Year – II Semester

Lecture: 0 Practical: 4 Internal Marks: 40

Credits: 2 Tutorial: 0 External Marks: 60

PREREQUISITES:

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Structure simple Python programs for solving problems.
2. Decompose a Python program into functions.
3. Represent compound data using Python lists, tuples, and dictionaries.
4. Read and write data from/to files in Python Programs.
5. To build software for real needs.

Concepts to be covered:

- **Introduction:**Variables,Assignment,Keywords, Comments, Input-Output, Indentation
- **Types, Operators and Expressions:** Datatypes, Operators, Control flow statements
- **Data Structures:** Lists, Tuples, Sets, Dictionary,Sequences,Comprehensions
- **Functions**: Types of Arguments, Anonymous, Fruitful and Lambda Functions.
- **Python Packages**: Installation and Importing packages, Brief tour of packages like System, math, random, date and time, Numpy, Matplotlib, Multi-threading, scikit-learn and Internet Access.
- **OOPs using Python**
- **Exception handling in python**

Lab Exercises:

1. Write a program to perform various list of operations(eg: Arithmetic,logical,bitwise etc) in python.
2. Write a program to implement control flow statements.
3. Write a programs implementing various predefined function of Lists,Sets,Tuples and Dictionaries.
4. Write a program covering various arguments for a function.
5. Write a program to implement various types of functions.

6. Write a program to implement recursion.
7. Write a program to implement command line arguments.
8. Write a program to create a class and its constructors .
9. Writea program to implement inheritance.
10. Write a program for exception handling.
11. Write a program to perform various linear algebra operations like finding eigen vales and vectors, determinant for a matrix.
12. Write a program to read a file.
13. Write a program to use System,mathetc packages.
14. Write a program for visualizing the data using matplotlibpackage .
15. Write a program to access data from the web and validate it.
16. Write a program to perform multi threading.

TEXT BOOKS

1. Learning Python, Mark Lutz, Orielly
2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013.

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. “Python in easy steps In Easy Steps”, Mike MC Grath, illustrated edition, In easy steps 2013 publishers.
5. Professional Python Frameworks: Web 2.0 Programming, Dana Moore, Raymond Budd, William Wright, Wrox Publication, ISBN: 978-0-470-13809-0, October 2007.
6. “Introduction to Programming Concepts with Case Studies in Python”, GöktürkÜçoluk Sinan Kalkan, Springer

III YEAR

SEMESTER-I

SYLLABUS

DATA MINING & DATA WAREHOUSING

III Year - I Semester **Course Code: 18CS5T01**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Identify the scope and necessity of Data Mining & Warehousing for the society.

2) Describe the design of Data Warehousing so that it can be able to solve the root problems.

3) To understand various tools of Data Mining and their techniques to solve the real time problems.

4) To develop ability to design various algorithms based on data mining tools.

5) To develop further interest in research and design of new Data Mining Techniques.

COURSE OUTCOMES:

1) Design data warehouse with dimensional modeling and apply OLAP operations.

2) Understand the Data Mining Principles and need of preprocessing

3) Compare and evaluate different data mining techniques like classification and prediction.

4) Identify the frequent patterns from transactional data.

5) Compare and evaluate different clustering techniques.

SYLLABUS

UNIT-I

Data Warehouse: Basic Concepts: What is a Data Warehouse? Differences between Operational Databases system (OLTP) and Data warehouses (OLAP). Data warehousing: A Multitier Architecture, Fundamentals of ETL architecture, Data Warehouse Design Methodology, Data Warehouse Modeling: Data Cube: A Multidimensional Data Model, Data Marts and Star Schema Design.

UNIT-II

Data Mining: Introduction: Data mining on What Kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Data Objects and Attribute Types.

Data Preprocessing: Why Preprocess the Data? Data Cleaning, Data Integration, Data Transformation, Data Reduction, Data Discretization

.**UNIT-III**

Classification and Prediction: Basic concepts: What is Classification? General Approach to solving a Classification problem. Decision Tree Induction: Working of Decision Tree, building a Decision Tree, methods for expressing an Attribute test Conditions, measures for selecting the best split, Algorithm for Decision Tree Induction.

Bayes Classification Methods: Bayes' Theorem, Naive Bayesian Classification, Bayesian Belief Networks, K-Nearest-Neighbor Classifiers.

UNIT-IV

Association Analysis: Basic Concepts and Algorithms: Problem Defecation. Frequent Item Set generation: The Apriority Principle, Frequent Item set Generation in the Apriori Algorithm, Candidate Generation and Pruning, Support counting. Rule generation: Confidence- Based Pruning, Rule Generation in Apriori Algorithm. Compact Representation of Frequent Item sets: Maximal Frequent Item sets, Closed Frequent Item sets. FP-Growth Algorithm: FP Tree Representation, Frequent Itemset Generation in FP-Growth Algorithm.

UNIT-V

Cluster Analysis: Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm

DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses.

TEXT BOOKS:

1) Jiawei Han Micheline Kamber, "Data mining & Techniques", Morgan Kaufmann Publishers.
(Units 1,2, 3)
2) Pang-Ning Tan, Michael Steinbach, Vipin Kumar, "Introduction to Data Mining", Pearson Publications (Units 4, 5)

REFERENCES:

1) S.N.Sivanandam, S.Sumathi, "Data Mining – Concepts, Tasks and Techniques", Thomson
2) Ralph Kimball, "The Data Warehousing Toolkit", Wiley.
3) Margaret H. Dunham, "Data mining - Introductory and advanced topics", Pearson Education.
4) D.Hand, H. Mannila and P.Smyth, "Principles of Data mining", PHI (2001).

WEB TECHNOLOGIES

III Year - I Semester **Course Code: 18CS5T02**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 2 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) This course is designed to introduce students with no programming experience to the programming languages and techniques associated with the World Wide Web.

2) The course will introduce web-based media-rich programming tools for creating interactive web pages.

COURSE OUTCOMES:

1) Analyze a web page and identify its elements and attributes.
2) Create web pages using HTML and Cascading Styles sheets.
3) Build dynamic web pages and client-side scripts using AJAX
4) Build web applications using PHP.
5) Develop interactive web pages that include databases

SYLLABUS

UNIT-I

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmers Tool box.HTML Common tags: List, Tables, images, forms, frames, HTML5, Cascading Style Sheets (CSS) & its Types, Style Specification Formats, Selector Forms, CSS3 modules

UNIT-II

Java Script: Introduction to Java Script, Declaring variables, Event handlers (onclick, onsubmit, etc.,) and Form Validation. Objects, Primitives Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Pattern Matching using Regular
Expressions, DHTML: Positioning Moving and Changing Elements

UNIT-III

XML: XML Syntax, Namespace in XML, Document type Definition, XML schemas, XSLT,DOM and SAX Approaches. **AJAX A New Approach:** Introduction to AJAX.

UNIT-IV: PHP Programming:

Introducing PHP: Creating PHP script, Running PHP script, working with variables and constants: Using variables Using constants, Data types, Operators. Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases.

UNIT-V

MySQL: Introduction to MySQL, Data types, Queries, Applying Filters, Usage of Grouping and Sort, SET Operators, CRUD operations, Joins, Integration of MySQL with PHP.

TEXT BOOKS:

1) Programming the World Wide Web, Robert W Sebesta, 7ed, Pearson.(Unit 1,2,3)
2) Web Technologies, Uttam K Roy, Oxford publications (Units 1,2 3)
3) The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill.(Unit 4)
3) MySQL The Complete Reference - VikramVaswani McGraw Hill.(Unit 5)

REFERENCES:

1) Ruby on Rails Up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2) Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3) Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
4) An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning

DESIGN AND ANALYSIS OF ALGORITHMS

III Year - I Semester **Course Code: 18CS5T03**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Reinforce basic design concepts (e.g., Pseudocode, specifications, top-down design)
2) Knowledge of algorithm design strategies
3) Ability to analyze time and space complexity

COURSE OUTCOMES:

1. Understand the performance Analysis of an Algorithm using Space and Time Complexities
2. Describe, apply and analyze the complexity of divide and conquer strategy.
3. Synthesize efficient Algorithms for common engineering problems using Greedy Method.
4. Apply and analyze the complexity of dynamic programming strategy.
5. Ability to solve complex problems using Back Tracking and Branch & Bound.

SYLLABUS

UNIT-I

Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Solving Recurrence relations.

UNIT-II

Divide and Conquer Method: General Method, Applications: Binary search, Quick sort, Merge sort, Defective Chessboard.

UNIT-III

Greedy Method: General method, Applications: Minimum cost spanning tree (Prim's and Kruskal's Algorithms), Single source shortest paths, Fractional Knapsack Problem, Job Sequencing with Deadlines.

UNIT-IV

Dynamic programming: General Method, Applications: Optimal Binary Search Tree, String Editing, 0/1 knapsack, Travelling salesman problem.

UNIT V

Back tracking: General Method, Applications: Sum of Subsets, Hamiltonian Cycles.

Branch and bound: General Method, Applications:0/1 Knapsack problem, travelling salesman problem.

Introduction to NP-Hard & NP-Complete Problems – Basic Concepts, Cook's Theorem.

TEXT BOOKS:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press

REFERENCES:

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman

2. Algorithm Design, Jon Kleinberg, Pearson.

3. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. PHILearning.

FORMAL LANGUAGES & AUTOMATA THEORY

III Year - I Semester **Course Code: 18CS5T04**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 2 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Introduce the student to the concepts of Theory of computation in computer science.
2) The students should acquire insights into the relationship among formal languages, formal Grammars and automata.

COURSE OUTCOMES:

1) Understand the basic concepts of Automata Theory
2) Infer the equivalence of languages described by finite automata and regular expressions.
3) Devise regular, context free grammars while recognizing the strings and tokens and able to Normalize grammars.
4) Apply Pushdown Automata for problem solving.
5) Understand basic properties and compute using Turing Machines.

SYLLABUS

UNIT-I

Finite Automata: Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String by a Finite Automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines.

UNIT-II

Regular Expressions: Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closures Properties, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

UNIT-III

Context Free Grammars: Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

UNIT-IV

Pushdown Automata: Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata.

UNIT-V

Turning Machine: Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Types of Turing Machines

TEXT BOOKS:

1) Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008. (Units 1, 2, 3, 4, 5).
2) Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N. Chandrasekharan, 3rd Edition, PHI, 2007. (Units (1, 2, 3, 4, 5).

REFERENCES:

1) Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
2) Introduction to Automata Theory, Formal Languages and Compuation, Shyamatendukandar, Pearson, 2013.
3) Theory of Computation, V.Kulkarni, Oxford University Press, 2013.
4) Theory of Automata, Languages and Computation, Rajendra Kumar, McGrawHill.

(Program Elective-I)

OBJECT ORIENTED ANALYSIS AND DESIGN

III Year- I Semester **Course Code: 18CS5T05**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) To understand how to solve complex problems.

2) Analyze and design solutions to problems using object oriented approach.

3) Study the notations of Unified Modeling Language.

COURSE OUTCOMES:

1) Understand the necessity of Object Modeling

2) Represent classes, responsibilities and states using UML notation.

3) Demonstrate knowledge about the conceptual Model of UML.

4) Model the event driven state of object and transform them into implementation specific layouts.

5) Identify, Analyze the subsystems, various components and collaborate them interchangeably.

SYLLABUS

UNIT-I

Introduction: Evolution of Object Model, Foundation of Object Model, Elements of Object Model, applying the Object Model.

UNIT-II

Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms.

UNIT-III

Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.

UNIT-IV

Basic Behavioral Modeling: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.

UNIT-V

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

TEXT BOOKS:

1) "The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, IvarJacobson, 12th Impression, 2012, PEARSON.

REFERENCES:

1) "Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning.
2) "The Unified modeling language Reference manual", James Rumbaugh, IvarJacobson, Grady Booch, Addison-Wesley.
3) "Object- Oriented Analysis & Design with Applications", Grady BOOCH, RobertA. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia. Houston, 3rd edition, 2013, PEARSON.

(Program Elective-I)

ADVANCED COMPUTER ARCHITECTURE

III Year - I Semester | Course Code: 18CS5T06

Lecture: 2 Practical: 0 | Internal Marks: 30

Credits: 3 Tutorial: 1 | External Marks: 70

COURSE OBJECTIVES:

1) The idea of Parallelism in computers.
2) The advanced concepts of computer architecture and exposing the major differentials of RISC and CISC architectural characteristics.
3) The functionalities of different memory systems and buses.
4) The features and functionalities in advanced processor architectures.
5) About the importance of multi processors and multi computers.

COURSE OUTCOMES:

1) Understand design of a computer and its Instruction Set
2) Interpret performance of different pipelined processors and memory mapping techniques.
3) Acquire in-depth knowledge of high performance instruction level parallelism.
4) Explore architectural features of advanced processors like shared memory architectures.
5) Analyze design issues of inter connection networks.

SYLLABUS

UNIT-I

Fundamentals of Computer Design: Fundamentals of Computer design, Changing faces of computing and task of computer designer, Technology trends, Cost price and their trends, Measuring and reporting performance, Quantitative principles of computer design, Amdahl's law. Instruction set principles and examples- Introduction, Classifying instruction set- Memory addressing- type and size of operands, Operations in the instruction set.

UNIT–II

Pipelines: Introduction, Basic RISC instruction set, Simple implementation of RISC instruction set, Classic five stage pipe lined RISC processor, Basic performance issues in pipelining, Pipeline hazards, and Reducing pipeline branch penalties.

Memory Hierarchy Design: Introduction, Review of ABC of cache, Cache performance, Reducing cache miss penalty, Virtual memory.

UNIT–III

Instruction Level Parallelism the Hardware Approach: Instruction-Level parallelism, Dynamic scheduling, Dynamic scheduling using Tomasulo's approach, Branch prediction, high performance instruction delivery- hardware based speculation.**ILP Software** Approach Basic compiler level techniques, Static branch prediction, VLIW approach, Exploiting ILP, Parallelism at compile time, Cross cutting issues -Hardware versus Software.

UNIT–IV

Multi Processors and Thread Level Parallelism: Multi Processors and Thread level Parallelism-Introduction, Characteristics of application domain, Systematic shared memory architecture, and Distributed shared – memory architecture, Synchronization.

UNIT–V

Inter Connection and Networks: Introduction, Interconnection network media, Practical issues in interconnecting networks, Examples of inter connection, Cluster, Designing of clusters.

TEXT BOOKS:

1) John L. Hennessy and David A. Patterson, Computer Architecture: A quantitative approach 5thed,Morgan Kaufmann Elsevier, 2013.

REFERENCES:

1) Computer Architecture and Parallel Processing – Kai Hwang, Faye A.Brigs., MC Graw Hill.
2) Advanced Computer Architecture – A Design Space Approach – DezsoSima, Terence Fountain, Peter Kacsuk , Pearson Ed.

(Program Elective-I)

ADVANCED OPERATING SYSTEMS

III Year - I Semester **Course Code: 18CS5T07**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) The aim of this module is to study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems).

2) Hardware and software features that support these systems.

COURSE OUTCOMES:

1) Outline the potential benefits of distributed operating systems.

2) Analyze the synchronization mechanism in distributed operating systems.

3) Infer the techniques used to detect and handle deadlocks in distributed operating systems.

4) Understand the process management in distributed operating systems.

5) Explore various distributed shared memory organizations.

SYLLABUS

UNIT–I

Introduction to Distributed systems: Goals of distributed system, hardware and software concepts, design issues. **Communication in Distributed systems**: Layered protocols, ATM networks, the Client - Server model, remote procedure call and group communication.

UNIT–II

Synchronization in Distributed systems: Clock synchronization, Mutual exclusion, E-tech Algorithms, the Bully algorithm, a ring algorithm, atomic transactions,

UNIT-III

Deadlocks: deadlock in distributed systems, Distributed deadlock prevention, and distributed dead lock detection.

UNIT–IV

Processes: Processes and Processors in distributed systems: Threads, system models, Processor allocation, Scheduling in distributed system, Fault tolerance and real time distributed systems.

UNIT-V

Distributed file systems: Distributed file systems design, distributed file system implementation, trends in distributed file systems**.**

Distributed shared memory: What is shared memory, consistency models, page based distributed shared memory, shared variable distributed shared memory, and object based DSM.

TEXT BOOKS:

1) Distributed Operating System - Andrew. S. Tanenbaum, PHI. (Units 1, 2.3).
2) Operating Systems' – Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education. (Units 4, 5).

REFERENCES:

1) Operating System Principles Abraham Silberchatz, Peter B.Galvin,Greg Gagme 7th Edition, John Wiley.
2) Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson

DATA MINING LAB

III Year - I Semester **Course Code: 18CS5L16**

Lecture: 0 Practical: 3 **Internal Marks: 40**

Credits: 1.5 Tutorial: 0 **External Marks: 60**

COURSE OBJECTIVES:

1) Practical exposure on implementation of well known data mining tasks.

2) Exposure to real life data sets for analysis and prediction.

3) Learning performance evaluation of data mining algorithms in a supervised and an unsupervised setting.

4) Handling a small data mining project for a given practical domain.

COURSE OUTCOMES:

1. Learn about WEKA tool and its applications
2. Extract knowledge using Data Mining techniques.
3. Adapt to new Data Mining tools.
4. Explore recent trends in Data Mining such as Web mining, spatial-temporal mining,

LIST OF LAB EXPERIMENTS

1. Demonstration of preprocessing on dataset student.arff
2. Demonstration of preprocessing on dataset labor.arff
3. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm
4. Demonstration of Association rule process on dataset test.arff using apriori algorithm
5. Demonstration of classification rule process on dataset student.arff using j48 algorithm
6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm
7. Demonstration of classification rule process on dataset employee.arff using Random Tree algorithm
8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm
9. Demonstration of clustering rule process on dataset iris.arff using simple k-means
10. Demonstration of clustering rule process on dataset student.arff using simple k- means.

WEB TECHNOLOGIES LAB

III Year - I Semester **Course Code: 18CS5L12**

Lecture: 0 Practical: 3 **Internal Marks: 40**

Credits: 1.5 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Knowledge of HTML, Java Script and XML to develop web applications

2) Understanding about JDBC connections and Java Mail API

3) Acquire Knowledge of the design and development process of a complete web application

LIST OF LAB EXPERIMENTS

1. Design the following static web pages required for an online book store web site.

i)HOME PAGE: The static homepage must contain three frames. ii) LOGIN PAGE iii) REGISTRATION PAGE IV) CATOLOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table.

2. Write JavaScript to validate the following fields of the Registration page.

I). FirstName (Name should contain alphabets and the length should not be less than 6 characters).

ii).Password (Password should not be less than 6 characters length).

iii). E-mailid (should not contain any invalid and must follow the standard pattern name@domain.com)

iv). Mobile Number (Phonenumbershouldcontain10digitsonly).

v).Last Name and Address (should not be Empty).

3. Develop and demonstrate the usage of inline, internal and external style sheet usingCSS

4. Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

i) Input: Click on Display Date button using onclick()function Output: Display date in the textbox

ii) Input: A number n obtained using prompt Output: Factorial of n number using alert

iii) Input: A number n obtained using prompt Output: A multiplication table of numbersfrom1 to 10of n using alert

iv) Input: A number n obtained using prompt and add another number using confirmOutput: Sum of the entire n numbers using alert

5. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next in the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

6. Write an HTML page including any required JavaScript that takes a number from text field in the range of0 to 999 and shows it in words. It should not accept four and above digits, alphabets and special characters.

7. Create an XML document thatcontains10 users information. Write a Java Program, which takes User Id as input and returns the user details by taking the user information from XML document using DOM parser or SAXparser.

8. Develop and demonstrate PHPScript for the following problems:

i) Write a PHP Script to find out the Sum of the Individual Digits.

ii) Write a PHP Script to check whether the given number is Palindrome or not

9. Implement the following web applications using (a) PHP

i) A web application that takes a name as input and on submit it shows a hello page where name is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You message with the duration of usage (hint: Use session to store name and time).

ii) Write a PHP Program to display current Date, Time and Day.

iii) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello, you are not authorized to visit the site" message, where should be replaced with the entered name. Otherwise it should send "Welcome to this site" message.

iv) A web application that lists all cookies stored in the browser on clicking"List Cookies" button. Add cookies if necessary.

10. Implement the web applications with Database using PHP

11. Modify the above PHP program to use an xmlinstead of database

12. Write a program to design a simple calculator using JavaScript and PHP

13. Installation and usage of XAMPP on the given operating system and get accustomed to usage of phpmyadmin.

14. Simple to complex queries in MySQL.

15. Examples using the integration of PHP with MySQL.

(Example1: Sign up form and login form)

(Example2: Construct a simple shopping cart by calculating price and reducing quantity dynamically.)

III YEAR

SEMESTER-II

SYLLABUS

COMPILER DESIGN

III Year – II Semester **Course Code: 18CS6T01**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) The process involved in a compiler.
2) Create an overall view of various types of translators, linkers, loaders, and phases of a compiler.
3) To apply the code generation algorithms to get the machine code for the optimized code.
4) What is syntax analysis, various types of parsers- top down approach, bottom up parsers.
5) Various aspects of the run-time environment into which the high-level code is translated.

COURSE OUTCOMES:

1) Acquire knowledge in different phases and passes of Compiler.
2) Demonstrate knowledge about scanning of tokens and perform the syntax analysis by using Top-down parsing techniques.
3) Perform the syntax analysis by using Bottom Up parsing techniques for more complex grammars.
4) Compare different memory management techniques in runtime environment.
5) Demonstrate knowledge about compiler generation tools and techniques.

SYLLABUS

UNIT–I

Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation.

Lexical Analysis: The role of lexical analyzer, Input buffering, specification of tokens. Recognition of tokens, The lexical analyzer generator - LEX.

UNIT–II

Syntax Analysis: The Role of a parser, Context free Grammars, Writing a grammar, Top down parsing - Backtracking, LL (1) Grammars, Recursive descent parsing, Non – recursive Predictive parsing, Error recovery in Predictive Parsing.

Bottom up parsing: Reductions, Handle Pruning, Shift – Reduce Parsing, Conflicts during Shift – Reduce Parsing,

UNIT –III

Simple LR Parser – LR Parsing Algorithm, SLR - Parsing Table, Viable Prefixes.

More Powerful LR parser – Constructing Canonical LR1, LALR parsing tables, Using Ambiguous Grammars, Error Recovery in LR parser.

UNIT – IV

Intermediated Code Generation: Variants of Syntax trees, 3 Address code – Quadruples, Triples.

Runtime Environments: Stack allocation of space, Access to Non Local data on the stack, Heap Management.

UNIT – V

Code Generation: – Issues in design of code generation, the target Language, peephole Optimization, A simple Code Generator. Basic Blocks & Flow Graphs, Optimization of Basic Blocks – DAGs, Local Common sub expression elimination.

Machine independent code optimization:

The principle sources of Optimization: Global Common sub expression elimination - Constant folding - Copy propagation - Dead code elimination – Induction Variable & Strength reduction - Loop optimization - Procedure in-lining.

TEXT BOOKS:

1. Compilers – Principles, Techniques and Tools. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffery D. Ullman, 2nd edition, Pearson - 2007.

REFERENCE BOOKS:

1. Compiler Construction, Principles and practice, Kenneth C Louden, CENGAGE

2. Implementations of Compiler, A New approach to Compilers including the algebraic methods, Yunlinsu, SPRINGER

3. LEX & YACC – John R. Levine, Tony Mason, Doug Brown, O'reilly

4. Principles of compiler design, 2nd edition, Nandhini Prasad, Elsevier.

COMPUTER NETWORKS

III Year - II Semester **Course Code: 18CS6T02**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
2) Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3) Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4) Learn various IEEE standards for medium access.
5) Recognize different network connecting devices.

COURSE OUTCOMES:

1) Independently enumerate the layers of the OSI model and TCP/IP
2) Identify the different types of network topologies and protocols.
3) Compare and contrast methods to identify Errors and correct them.
4) Differentiate between various network routing algorithms.
5) Understand WWW and HTTP Architectures.

SYLLABUS

UNIT–I

Introduction: OSI overview, TCP/IP and other networks models, Examples of Networks: Arpanet, Internet, Network Topologies Wide Area Networks(WAN), Local Area Networks(LAN), Metropolitan Area Networks(MAN).

UNIT–II

Physical Layer and overview of PL Switching: Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT–III

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet checksum, services provided to Network.

Elementary Data Link Layer protocols: Simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. **Sliding window protocol**: One bit, Go-back N, Selective Repetitive protocol, Stop and wait protocol.

UNIT – IV

Random Access: ALOHA, MAC addresses, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: Frequency Division Multiple Access(FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access(CDMA).

Network layer: Shortest Path, Distance Vector Routing Algorithm, Hierarchal routing algorithm

UNIT–V

Application layer (WWW and HTTP): WWWARCHITECTURE: Client (Browser),Server, Uniform Resource Locator, Resource Record, HTTP: HTTP Transaction, HTTP Operational Model and Client/Server Communication, HTTP Request Message Format, HTTP Response Message Format.

TEXT BOOKS:

1. Data Communications and Networks – Behrouz A. Forouzan. Third Edition TMH.
Units 1,2,4)
2**.** Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education (Units 1, 3, 5)

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

SOTWARE ENGINEERING

III Year - II Semester **Course Code: 18CS6T03**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To grasp generic models to structure the software development process.
2) To understand core concepts of requirements engineering and requirements specification.
3) To recognize different notion of complexity at both the module and system level.
4) To be aware of some widely known design methods.
5) To understand the role and contents of testing activities in different life cycle phases.

COURSE OUTCOMES:

1) Understand the perspective of various software process models
2) Understand the Requirements Engineering Process and compile an SRS
3) Analyze the requirements and perform a Design
4) Apply testing principles on software project and understand the maintenance concepts.
5) Identify risks, manage the change to assure quality in software projects

SYLLABUS

UNIT-I

The Evolving Role of Software – Software – The changing Nature of Software – Legacy software — A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment –Personal and Team Process Models – Product and Process – Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – The Unified Process.

UNIT-II

Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams,

Designing the architecture. Assessment: Impact of Requirement Engineering in their problem. Decision Tables, SRS Document, IEEE Standards for SRS, Design: Architectural design, component level design, user interface design.

UNIT-III

Requirements Analysis – Analysis Modeling Approaches: Design Engineering – Design Process -Design Quality - Design Model - User Interface Design

Design: Modeling with UML, Use case Diagrams, Class Diagrams, Object Diagrams, Sequence Diagrams, Collaboration Diagrams, Component Diagrams, Deployment Diagrams

Coding standards, Coding Guidelines, Modern Programming Language features, Documentation Guidelines

UNIT-IV

Implementation and Testing: Quality concepts, Review techniques, Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing, Software Testing Strategies - Strategies: Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Testing conventional applications, Testing object oriented applications, and Testing Web applications.

UNIT-V

Project Management Concepts, Process and Project Metrics, Estimation for Software projects, Software Cost Estimation, Project Scheduling, Risk Management, Maintenance and Reengineering. Assessment: Preparation of Risk mitigation plan.

TEXT BOOKS:

1. “Fundamentals of Software Engineering”, Rajib Mall, PHI Publication, 3rdedition.(Units 1,2,5)
2. Software Engineering, A Precise approach, Pankaj Jalote, Wiley.(Units 3,4)
3. Software Engineering, concepts and practices, Ugrasen Suman, Cengage learning(Units 3,5)

REFERENCES:

1. Roger S. Pressman, -Software Engineering: A Practitioner‘s Approach‖, McGraw Hill International edition, Seventh edition.

2. Stephan Schach, ―Software Engineering‖, Tata McGraw Hill.
3. Ian Sommerville, Software Engineering, 9th Edition, Pearson Publishers.

(Program Elective-II)

UNIX & SHELL PROGRAMMING

III Year - II Semester **Course Code: 18CS6T04**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Written technical communication and effective use of concepts and terminology.
2) Facility with UNIX command syntax and semantics.
3) Ability to read and understand specifications, scripts and programs.
4) Individual capability in problem solving using the tools presented within the class
5) Students will demonstrate a mastery of the course materials and concepts within in class discussions.

COURSE OUTCOMES:

1) Create powerful data processing applications using UNIX shell and commands
2) Manage data, files and programs at command line using UNIX
3) Create and modify data files and documents using editors and tools
4) Demonstrate knowledge of creating new commands.
5) Develop Scripts and programs that demonstrate effective use of structured programming.

SYLLABUS

UNIT-I

Introduction to UNIX-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-PATH, man, echo, who, date, stty, pwd ,cd, mkdir, rmdir, cp, mv, rm, cat, more, wc, tar, kill, sleep.

UNIT-II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-INodes-The Directory Hierarchy, ls command with options-File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Introduction to Basic Regular Expressions -The Grep Command with options-EGrep and FGrep Commands, The Stream Editor Sed Command with options-The AWK command- awk preliminaries, awk using print and printf.

UNIT-IV

Simple Filtering commands: pr, cmp, comm, diff, head tail, cut, paste, sort - Meta characters-Creating New Commands - More on I/O Redirection- Command Substitution-Giving Multiple commands- Command Line Structure.

UNIT-V

Shell Programming-Shell Variables-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The Sleep Command-Debugging Scripts-The Script Command.

TEXT BOOKS:

1. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.(Units 1,2,3,4,5)
2. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.(Unit 2,4)

REFERENCE BOOKS:

1. Unix and shell programming by B.M. Harwani, OXFORD university press.
2. UNIX and Shell Programming by Behrouz A. Forouzan, Richard F. Gilverg

(Program Elective-II)

INTERNET OF THINGS

III Year - II Semester **Course Code: 18CS6T05**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Understand the architecture of Internet of Things and connected world.
2) Explore on use of various hardware, communication and sensing technologies to build IoT applications.
3) Develop the real time IoT applications to make smart world.
4) Understand challenges and future trends in IoT.

COURSE OUTCOMES:

1) Design and Deployment of IoT.
2) Design and comparing M2M with IoT
3) Understand Platform design and modeling of IoT
4) Apply IoT in different devices using Python
5) Implement IoT and cloud platforms

SYLLABUS

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT Enabling Technologies, IoT levels and deployment, domains Specific IoTs.

UNIT-II

IoT AND M2M : Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model. Logical design using Python: Installing Python, Python data types and data Structures, control flow, functions, modules, packages, file handling.

IoT Physical Devices and Endpoints: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-IV

IoT Protocols: Messaging Protocols- MQ Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) Transport Protocols-Light Fidelity(Li-Fi), Bluetooth Low Energy(BLE)

IoT Protocols: Addressing and Identification: Internet Protocol Version 4(IPV4), Internet Protocol Version 6(IPV6), Uniform Resource Identifier (URI)

UNIT-V

IoT Physical Servers And Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

TEXT BOOKS:

1) ArshdeepBahga, Vijay Madisetti, “Internet of Things: A Hands-on-Approach”, VPT, 1stEdition, 2014.(Units 1,2,3,5)
2) Matt Richardson, Shawn Wallace, “Getting Started with Raspberry Pi”, O’Reilly (SPD), 3rdEdition, 2014.(Unit 3)
3) Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram “ Internet of Things” Wiley(Unit 4)

REFERENCE BOOKS:

1) Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2) Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, John Wiley andSons2014.

(Program Elective-II)

DISTRIBUTED SYSTEMS

III Year - II Semester **Course Code: 18CS6T06**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To learn the principles, architectures, algorithms and programming models used in distributed systems.
2) To examine state-of-the-art distributed systems concepts of operating system, Middleware.

COURSE OUTCOMES:

1) Differentiate between various System Models
2) Infer the importance of Inter process Communication in Distributed Systems.
3) Understand concepts of RMI and RPC
4) Demonstrate Knowledge of operating system support in distributed systems.
5) Understand various methods of concurrency control in Distributed Transactions.

SYLLABUS

UNIT-I

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and web, challenges. **System Models**: Introduction, Architectural and Fundamental models- Interaction Model.

UNIT-II

Inter Process Communication: Introduction, The API for the internet protocols-The Characteristics of Inter process communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling, Client-Server Communication, Group Communication.

UNIT-III

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Modal, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications.

UNIT-IV

Operating System Support: Introduction, the Operating System Layer, Protection, Processes and Threads –Address Space, Creation of a New Process, Threads. Communication and Invocation

UNIT-V

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control. **Distributed Transactions**: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

TEXT BOOKS:

1) Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 4th Edition,2009.

REFERENCES:

1) Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van Steen, Second Edition, PHI.
2) Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC, Taylor &Fransis Group, 2007.
3) Ajay D Kshemkalyani, Mukesh Sighal, “Distributed Computing, Principles, Algorithms and Systems”,Cambridge.

COMPUTER NETWORKS LAB

III Year - II Semester **Course Code: 18CS6L21**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Practical orientation of networking concepts
2) To teach students various forms of IPC through UNIX and socket Programming

LIST OF LAB EXPERIMENTS

1) Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, traceroute, whoisetc. Usage of elementary socket system calls (socket (), bind(), listen(), accept(), connect(), send(), recv(),sendto(),recvfrom()).
2) Implement the data link layer farming methods such as character stuffing and bit stuffing.
3) Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
4) Implement Dijkstra‘s algorithm to compute the Shortest path thru a graph.
5) Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node usingdistance vector routing algorithm
6) Take an example subnet of hosts. Obtain broadcast tree for it.
7) Design TCP iterative Client and server application to reverse the given input sentence
8) Design UDP Client and server application to reverse the given input sentence
9) Implementation of getsockopt (), setsockopt () system calls.
10) Implementation of SMTP.

SOFTWARE ENGINEERING LAB

III Year - II Semester **Course Code: 18CS6L12**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Prepare SRS document, design document, test cases and software configuration management and risk management related document.
2) Develop function oriented and object oriented software design using tools like rational rose.
3) Design and develop Test Cases for a system
4) Track the progress of a project using various tools.

LIST OF LAB EXPERIMENTS

1) Create the problem statement for a specific system of relevance
2) Perform requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3) To carry out the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4) To draw UML Diagrams for a suggested system
5) To illustrate the test cases, test case preparation and perform Manual Tests.
6) Perform Estimation of effort using FP Estimation for chosen system.
7) To prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Note: Students shall prepare a document related to all the above activities for at least one real time Case Study

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

III Year - II Semester **Course Code: 18CS6T23**

Lecture: 2 Practical: 0

Credits: 0 Tutorial: 0

COURSE OBJECTIVES:

1) The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
2) To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
3) The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
4) To know the student traditional knowledge in different sector.

COURSE OUTCOMES:

1) Understand the concept of Traditional knowledge and its importance
2) Know the need and importance of protecting traditional knowledge
3) Know the various enactments related to the protection of traditional knowledge.
4) Understand the concepts of Intellectual property to protect the traditional knowledge
5) Evaluate strategies to increase the protection of TK.

SYLLABUS

UNIT-I

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT-II

Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT-III

Legal framework and TK:A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);**B:**The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

UNIT-IV

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

REFERENCES:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

IV YEAR
SEMESTER-I
SYLLABUS

BIG DATA & HADOOP

IV Year - I Semester **Course Code: 18CS7T01**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Optimize business decisions and create competitive advantage with Big Data analytics
2) Introducing Java concepts required for developing map reduce programs
3) Derive business benefit from unstructured data
4) Imparting the architectural concepts of Hadoop and introducing map reduce paradigm

COURSE OUTCOMES:

1) Understand methods for data summarization, query, and analysis.
2) Apply data modeling techniques to large data sets
3) Creating applications for Big Data analytics
4) Building a complete business data analytic solution.
5) Understand programming tools PIG & HIVE in Hadoop eco-system.

SYLLABUS

UNIT-I

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; **Generics:** Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

UNIT-II

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Name node, Data node, Secondary Name node, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT-III

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner

UNIT-IV

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators

UNIT-V

Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

TEXT BOOKS:

1) Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC (Unit 1)
2) Hadoop: The Definitive Guide by Tom White, 3 Edition, O'reilly(Unit 2,3,4)
3) Hadoop in Action by Chuck Lam, MANNING Publ.9(Unit 2)
4) Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss (Unit 5)

REFERENCE BOOKS:

1) Hadoop in Practice by Alex Holmes, MANNING Publ.
2) Hadoop MapReduce Cookbook, SrinathPerera, ThilinaGunarathne

CRYPTOGRAPHY & NETWORK SECURITY

IV Year - I Semester **Course Code: 18CS7T02**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Classical systems, symmetric block ciphers (DES, AES, other symmetric ciphers)
2) Public-key cryptography (RSA, discrete logarithms)
3) Algorithms for factoring and discrete logarithms, cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes,
4) Email and web security.

COURSE OUTCOMES:

1) Understand the need of information security andits importance.
2) Apply symmetric security mechanisms for confidentiality
3) Apply asymmetric security mechanisms for confidentiality
4) Apply digital signature techniques for authentication
5) Understand network security designs using available secure solutions (such asPGP, SSL, IPSec)

SYLLABUS

UNIT-I

Introduction: Security Goals, Cryptographic Attacks, Services and Mechanisms, Techniques

Mathematics of Cryptography: Integer Arithmetic, Modular Arithmetic, Matrices , Linear Congruence,

Traditional Symmetric Key Ciphers: Introduction, Cipher Model, Substitution ciphers, Transportation cipher, Stream and Block Ciphers.

UNIT-II

Symmetric Key Encryption:

Mathematics of Cryptography- Algebraic Structures, GF Fields

Modern Symmetric Key Cryptography: Modern Block Ciphers, Modern Stream ciphers

Data Encryption Standard: DES Structure, DES Analysis, Multiple DES, Security of DES

Advanced Encryption Standard: Introduction, Transformations, Key Expansion, Analysis of AES.

UNIT-III

Asymmetric Key Cryptography:

Mathematics of Cryptography: Primes, Primality Testing, Factorization, Chinese Remainder Theorem.

Asymmetric Key Cryptography: Introduction, RSA Cryptosystems, Rabin Cryptosystems, ELGAMAL Cryptosystem, Elliptic Curve CryptoSystem.

UNIT- IV

Data Integrity, Digital Signature Schemes & Key Management:

Message Integrity and Message Authentication

Cryptographic Hash Functions:Introduction, SHA-512, Whirlpool

Digital Signature: Comparison, Process, Services, Attacks on Digital Signature, Digital Signature Shemes

Key Management: Symmetric Key Distribution, Kerberos, Symmetric key Agreement, Public Key Distribution.

UNIT -V

Security at application layer: PGP and S/MIME,

Security at the Transport Layer: SSL and TLS- SSL Architecture, Four Protocols, SSL Message Formats, Transport layer Security

Security at the Network Layer: IPSec- Two modes, Two Security Protocols, Security Association, security policy, Internet Key Exchange

TEXT BOOKS:

1) Cryptography and Network Security, Behrouz A Forouzan, Debdeep Mukhopadhyay, (3e)
Mc Graw Hill. (Units 1, 2, 3, 4, 5)

REFERENCE BOOKS:

1) Cryptography and Network Security, William Stallings, (6e) Pearson.
2) Network Security and Cryptography, Bernard Meneges, Cengage Learning.
2) Everyday Cryptography, Keith M.Martin, Oxford.

(Program Elective-III)

MACHINE LEARNING & DEEP LEARNING

IV Year - I Semester **Course Code: 18CS7T03**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) To introduce students to the basic concepts and techniques of Machine Learning and deep learning.
2) To develop skills of using recent deep learning software for solving practical problems.
3) To gain experience of doing independent study and research.

COURSE OUTCOMES:

1) Understand the basic concepts of concept learning
2) Understand the concepts of evaluating the hypothesis
3) Understand the concept behind neural networks for learning non-linear functions.
4) Develop a deep neural network for image classification
5) Develop a deep network for sequence data analysis

SYLLABUS

UNIT-I

Introduction: Well posed learning problems, Designing a Learning system, Perspective and Issues in Machine Learning.

Concept Learning: Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias.

UNIT-II

Evaluating Hypothesis: Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms.

Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting.

UNIT-III

Artificial Neural Networks: Introduction, Neural Network representation, Perceptrons, multi-layer perceptron, Feed forward neural network, Training Neural Network: Risk minimization, loss function, regularization, model selection, and optimization, Back propagation with case study.

UNIT-IV

Deep Learning: Deep Feed Forward network, regularizations, training deep models, dropouts, Convolution Neural Network.

UNIT-V

Recurrent Neural Network, Auto encoders Introduction to Deep Learning Tools: Tensor Flow, keras.

TEXT BOOKS:

1) Tom M. Mitchell, "Machine Learning" , India Edition 2013, McGraw Hill Education (Unit 1, 2, 3)
2) Huan Liu and Hiroshi Motoda, "Feature Selection For Knowledge Discovery And Datamining" ,Springer Science + Business Media, LLC 1998. (Unit 2)
3) Cha Zhanga and YunqianMa , "Ensemble Machine Learning Methods and Applications", Springer Science + Business Media, LLC 2012 (Unit 2)
4) Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016. (Unit 4)

REFERENCES:

1. Deep Learning with python by Francois Chollet, Manning Publications.
2. Hands-on Machine Learning with Scikit-learn and TensorFlow by AurelienGeron, O'Reilly Media,2017
3. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.

Program Elective-III

SOFT COMPUTING

IV Year - I Semester **Course Code: 18CS7T04**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Soft computing refers to principle components like fuzzy logic, probabilistic computing, evolutionary computing and genetic algorithm, which have their roots in Artificial Intelligence.
2) Healthy integration of all these techniques has resulted in extending the capabilities of the technologies to more effective and efficient problem solving methodologies.

COURSE OUTCOMES:

1) Understand soft computing Vs hard computing
2) Interpret fuzzy systems
3) Apply Adaptive Resonance Theory
4) Analyze and Apply genetic Algorithms
5) Explain fundamentals of differential evolution.

SYLLABUS

UNIT-I

Introduction: What is Soft Computing? Importance of Soft Computing, Properties of Soft Computing methods, Difference between Hard and Soft computing, Major Areas of Soft Computing, Applications of Soft Computing.

UNIT-II

Fuzzy Set Theory: Fuzzy Versus Crisp, Crisp Sets, Fuzzy Sets, Crisp Relations, Fuzzy Relations (Text Book 1)

Fuzzy Systems: Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Rule Based Systems, Defuzzification Methods.

UNIT-III

Adaptive Resonance Theory: Introduction, ART1: Architecture of ART1, Special features fo ART1 Models,ART1 Algorithm, Illustration, ART2: Architecture of ART2, ART2 Algorithm, Illustration, Applications: Character Recognition using ART1, Classification of Soil.

UNIT-IV

Genetic Algorithm: Introduction, Biological Background, Traditional Optimization and Search Techniques, Genetic Algorithm and Search Space, Genetic Algorithm vs. Traditional Algorithms, Basic Terminologies in Genetic Algorithm, Simple GA, General Genetic Algorithm, Operators in Genetic Algorithm, Stopping Condition for Genetic Algorithm Flow, Constraints in Genetic Algorithm, Problem Solving Using Genetic Algorithm, Advantages and Limitations of Genetic Algorithm .

UNIT-V

Differential Evolution Algorithm: Differential Evolution – Process Flow and Operators, Selection of DE Control Parameters, Schemes of Differential Evolution, Numerical Illustration of DE Algorithm for a Simple Function Optimization, Applications of Differential Evolution.

TEXT BOOKS:

1. S.Rajasekaran, G.A. Vijayalakshmi Pai, Neural Networks, fuzzy logic, and genetic algorithms - Genetic Algorithm, PHI Learning Private Limited- 2010. (Unit 2, 3,4).
2. S.N.Sivanandam, S.N.Deepa Wiley India , Principles of SOFT COMPUTING, Second Edition 2011.(Unit 1, 5)

REFERENCES:

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications” Wiley India.
2. SimanHaykin,”NeuralNetowrks”Prentice Hall of India. 3. Kumar Satish, “Neural Networks” Tata Mc Graw Hill.

(Program Elective-III)

DATA ANALYTICS

IV Year - I Semester **Course Code: 18CS7T05**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1. To understand Data Analytics lifecycle and Business Challenges.
2. To understand Analytical Techniques
3. To understand various tools and technologies to handle big data

COURSE OUTCOMES:

1. Understand big data and data analytics life cycle.
2. Explore various supervised learning methods.
3. Explore various unsupervised learning methods.
4. Understand and apply ARIMA model on time series data.
5. Learn various technology and tools in big data analytics.

SYLLABUS

UNIT-I

Introduction to Big Data Analytics: Big Data Overview, State of the Practice in Analytics, Key Roles for the new big data Ecosystem, Examples of Big Data Analytics.

Data Analytics Life Cycle: Data Analytics life cycle Overview, Discovery, Data Preparation, Model Planning, Model Building, Communicate Results, Operationalize, Case Study.

UNIT-II

Supervised Learning: Decision Trees – Overview of Decision Trees, The General Algorithm, Decision Tree Algorithms, Evaluating a Decision Tree. **Naive Bayes:** Baye's Theorem, Naïve Baye's Classifier, Diagnostics of Classifiers.

Regression –Linear Regression, Logistic Regression.

UNIT-III

Unsupervised Learning: Association Rule Mining–Overview, Apriori Algorithm, Evaluation of Candidate Rules, Applications of Association Rules.

Cluster Analysis –Overview of Clustering, k-means

UNIT IV

Time Series Analysis: Overview of Time Series Analysis, ARIMA Model

Text Analysis: Text Analysis Steps, Example, Collecting Raw Data, Representing Text, TFIDF, Categorizing Documents by Topics, Determining Sentiments, Gaining Insights.

UNIT-V

Technology and Tools: MapReduce and Hadoop- Analytics for Unstructured Data, The Hadoop Ecosystem

In-DataBase Analytics: SQL Essentials, In-Database Text Analysis, Advanced SQL.

TEXT BOOKS:

1. David Dietrich, Barry Hiller, "Data Science and Big Data Analytics", EMC education services, Wiley publications, 2012.

REFERENCE BOOKS:

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012.

2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O" Reilly, 2011.

3. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

(Program Elective-IV)

EMBEDDED SYSTEMS

IV Year - I Semester **Course Code: 18CS7T06**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Technology capabilities and limitations of the hardware, software components
2) Methods to evaluate design tradeoffs between different technology choices.
3) Design Methodologies.

COURSE OUTCOMES:

1) Program an embedded system
2) Design, implement and test an embedded system.
3) Identify the unique characteristics of real-time systems
4) Explain the general structure of a real-time system
5) Define the unique design problems and challenges of real-time systems.

SYLLABUS

UNIT-I

Introduction to Embedded systems: What is an embedded system Vs. General Computing system, history, classification, major application areas, Purpose of embedded systems, Core of embedded system, Characteristics and Quality Attributes of Embedded Systems, Application Specific and Domain specific embedded systems-Examples?

UNIT-II

Factors to be considered in selecting a controller, 8051 architecture, RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-III

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

UNIT-IV

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-V

Simulators, Emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOK:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009.

REFERENCE BOOKS:

1. Ayala &Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.
3. Embedded Software Primer, David Simon, and Pearson.
4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,.

(Program Elective-IV)

SOFTWARE TESTING METHODOLOGIES

IV Year - I Semester **Course Code: 18CS7T07**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2) To Understand different levels of Testing
3) Apply Black Box and White Box Testing Techniques
4) To learn how to plan a test project, design test cases and data, conduct testing operations, and generate a test report.
5) To understand software test automation problems and solutions.

COURSE OUTCOMES:

1) Have an ability to apply software testing knowledge and engineering methods.
2) Ability to identify the needs of software test automation, and define a test tool to support test automation.
3) Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
4) Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
5) Apply techniques and skills to use modern software testing tools to support software testing projects.

SYLLABUS

UNIT-I

Software Testing: Introduction, Evolution, Dichotomies, Goals & Typical Objectives of Testing, Model for testing, Software Testing Principles, **Software Testing Terminology and Methodology:** Software Testing Terminology, Errors, Defects, Failures, Root Causes and Effects, Software Testing Life Cycle, Software Testing Methodology.

UNIT-II

Verification and Validation: Verification & Validation Activities, Categories of Test Techniques: Dynamic Testing,

Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing,

White-Box Testing: Need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing

UNIT-III

Experience Based Testing Techniques: Error Guessing, Exploratory Testing, Checklist- based Testing

Static Testing: Inspections, Structured Walkthroughs, Technical reviews, Benefits of Static Testing, Static Vs Dynamic Testing.

Levels of Testing: Unit testing, Integration Testing,. Function testing, System testing and Acceptance testing.

Regression testing: Progressive Vs Regressive testing, Objectives of regression testing, Regression testing techniques

UNIT-IV

Test Management: Test Organization, Test Planning, Test Design and Test case specifications, Structure of a Testing Group, Reasons for the growth of a Test suite, Test suite Minimization, Test suite prioritization, Types of test case prioritization, prioritization techniques, Measuring the effectiveness of a prioritized test suite.

Debugging: Debugging process, Debugging Techniques, Correcting Bugs, Debuggers

UNIT-V

Automation and Testing Tools: Need for automation, Testing Tool Considerations, Test Tool Classification, Benefits and Risks of Test automation, Special Considerations for Test execution and Test Management Tools, Principles for tool selection, Testing tools- success factors, Guidelines for automated testing, overview of some commercial testing tools.

TEXT BOOKS:

1. Software testing techniques - Baris Beizer, International Thomson computer press, second edition. (Unit 1)
2. Software Testing, Principles and Practices, Naresh Chauhan, Oxford Publishers(Unit 2,3,4,5)

REFERENCES

1. Effective Methods for Software testing, Willian E Perry, 3ed, Wiley
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH

(Program Elective-IV)

SOFTWARE PROJECT MANAGEMENT

IV Year - I Semester **Course Code: 18CS7T08**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2) To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3) To understand successful software projects that support organization's strategic goals

COURSE OUTCOMES:

1) Understand the basic concepts and issues of software project management
2) Gain knowledge on effective planning and estimation of software projects.
3) Understand the importance of Risk Management in software Projects.
4) Select and employ mechanisms for tracking the software projects
5) Understand Process and Product Quality metrics

SYLLABUS

UNIT-I

Introduction: Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure.

UNIT-II

Project Approach: Software Lifecycle models, Lifecycle phases

Effort estimation: Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation

UNIT-III

Activity Planning: Activity Identification Approaches, Network planning models, Critical path analysis.

Risk Management: Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

UNIT-IV

Project Monitoring & Control, Resource Allocation: Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

Managing People &Organizing Teams: Oldham-Hackman Job characteristics model, Influence of culture

UNIT-V

Software Quality: Planning Quality, Defining Quality - ISO 9126, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality, Quality plan of ACIC project

TEXT BOOKS:

1. Software Project Management in practice, Pankaj Jalote, Pearson. (Units 1, 2, 3, 4, 5)
2. Software Project Management, Walker Royce: Pearson Education (Units 4, 5)

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA McGraw-Hill
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Quality, Ben-Menachem ,Marliss

BIG DATA & HADOOP LAB

IV Year - I Semester **Course Code: 18CS7L20**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Preparing for data summarization, query and analysis.
2) Applying data modeling techniques to large data sets.
3) Creating applications for Big data Analytics.
4) Building a complete business data analytic solution.

LIST OF LAB EXPERIMENTS

Week 1, 2:

1. Implement the following Data structures in Java

a)Linked Lists b) Stacks c) Queues d) Set e) Map

Week 3, 4:

2. (i) Perform setting up and Installing Hadoop in its three operating modes:

- Standalone,
- Pseudo distributed,
- Fully distributed
- (ii)Use web based tools to monitor your Hadoop setup.

Week 5:

3. Implement the following file management tasks in Hadoop:

- Adding files and directories
- Retrieving files
- Deleting files
- Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

Week 6:

4. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

Week 7:

5. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

Week 8:

6. Implement Matrix Multiplication with Hadoop Map Reduce

Week 9, 10:

7. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Week 11, 12:

8. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

MINI PROJECT/INTERNSHIP

IV Year - I Semester **Course Code: 18CS7L21**

Lecture: 0 Practical: 4 **Internal Marks: 100**

Credits: 2 Tutorial: 0 **External Marks:**

- The students are expected to take up an internship program with prior approval from the Department committee after III Year II Semester during the summer break which will be evaluated in the IV Year I Semester. The Internship program shall be for duration of 4 to 6 Weeks.
- The student shall submit a letter of Successful completion of the internship from the organization and present the work carried out to the evaluation committee.
- If the student was unable to take up in the internship program he/she has to take up a project work and will be evaluated in this semester by the Department Internal Evaluation Committee
- Continues evaluation will be done for 40 Marks and final evaluation will be done for 60 Marks

IV YEAR
SEMESTER-II
SYLLABUS

Program Elective-V

CLOUD COMPUTING

IV Year - II Semester **Course Code: 18CS8T01**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Explain the technology and principles involved in building a cloud environment
2) Apply Map-Reduce concept to applications.
3) To implement Virtualization
4) Contrast various programming models used in cloud computing
5) Choose appropriate cloud model for a given application.

COURSE OUTCOMES:

1) Explain and characterize different cloud deployment models and service models
2) Understand different cloud programming platforms and tools\
3) Illustrate Virtualization for Data-Center Automation.
4) Identify the security issues in cloud computing
5) Understand various basic concepts related to cloud computing technologies

SYLLABUS

UNIT-I

Introduction and Evolution of Computing Paradigms: Overview of Existing Hosting Platforms, Cluster Computing, Grid Computing, Utility Computing, Autonomic Computing, Green Computing, Cloud Computing, history and evolution, practical applications of cloud computing for various industries, IoT, economics and benefits of cloud computing, spot markets, pricing models, Supercomputing-on-demand.

UNIT-II

Cloud Issues and Challenges: Cloud computing issues and challenges like Security, Elasticity, Resource management and Scheduling, QoS (Quality of Service) and Resource Allocation, Cost Management, Big Data, Pre-reservation and Cloud bursting.

Cloud Computing Architecture: Cloud Architecture model, Types of Clouds: Public Private & Hybrid Clouds, Cloud based services: Iaas, PaaS and SaaS.

UNIT-III

Data Center: Classic Data Center, Virtualized Data Center (Compute, Storage, Networking and Application), Business Continuity in VDC.

Virtualization: Virtualization, Advantages and disadvantages of Virtualization, Types of Virtualization: Resource Virtualization i.e. Server, Storage and Network virtualization, Migration of processes, VMware vCloud – IaaS

UNIT-IV

Cloud based Data Storage: Introduction No-SQL databases, Map-Reduce framework for Simplified data processing on Large clusters using Hadoop, Design of data applications based on Map Reduce in Apache Hadoop, Task Partitioning, Data partitioning, Data Synchronization, Distributed File system, Data Replication , Shared access to weakly consistent to data stores

UNIT-V

Classification of Cloud Implementations: Amazon Web Services, The Elastic Compute Cloud (EC2), The Simple Storage Service (S3), The Simple Queuing Services (SQS), Google AppEngine - PaaS, Windows Azure, Aneka, Hadoop, Microsoft Dynamics CRM, A Comparison of Cloud Computing Platforms.

TEXT BOOKS:

1. Raj Kumar Buyya, James Broberg, AndrezeiM.Goscinski, Cloud Computing: Principles and paradigms, MIT Press (2011). (Units 1,2)
2. Cloud Computing: A practical Approach Anthony Velte, Toby Velte and Robert Elsenpeter by Tata McGrawHill (2009). (Unit 5)
3. Michael Miller, Cloud Computing, Que Publishing (2008).(Unit 3,4)

REFERENCES:

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH
2. Judith Hurwitz, Robin Bllor, Marcia Kaufman, F Halper, Cloud Computing for dummies (2009).
3. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier
4. Hwang, Kai, Jack Dongarra, and Geoffrey C. Fox. Distributed and cloud computing: from parallel processing to the internet of things. Morgan Kaufmann, 2013.

Program Elective-V

MOBILE COMPUTING

IV Year - II Semester **Course Code: 18CS8T02**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.

2) To understand the typical mobile networking infrastructure through a popular GSM protocol.

3) To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer.

4) To understand the database issues in mobile environments & data delivery models.

5) To understand the ad hoc networks and related concepts.

COURSE OUTCOMES:

1) Develop new mobile applications.

2) Identify solutions to the technical issues in the mobile communication paradigm.

3) Understand the ad hoc network applications and/or algorithms/protocols.

4) Understand & develop any existing or new protocol related to mobile environment.

5) Understand the platforms and protocols used in mobile environment

SYLLABUS

UNIT–I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT–II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

UNIT–III

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT –IV

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks. Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT-V

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2009.(Units 1,2,3)
2. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007, ISBN: 0195686772(Units 4,5)

REFERENCES:

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, “Mobile Computing, Technology Applications and Service Creation” Second Edition, McGraw Hill.
2. UWE Hansmann, LotherMerk, Martin S. Nocklous, Thomas Stober, “Principles of Mobile Computing,” Second Edition, Springer.

(Program Elective-V)

IMAGE PROCESSING

IV Year - II Semester **Course Code: 18CS8T03**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To comprehend the relation between human visual system and machine perception and processing of digital images.
2) To provide a detailed approach towards image processing applications like enhancement, segmentation, and compression.

COURSE OUTCOMES:

1) Explore the limitations of the computational methods on digital images.
2) Understand the spatial and frequency domain image transforms on enhancement and restoration of images.
3) Elaborate understanding on image enhancement techniques.
4) Understand Morphological Image Processing techniques
5) Define the need for compression and evaluate the basic compression algorithms.

SYLLABUS

UNIT-I

Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels. Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT-II

Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement through Point Processing, Types of Point Processing, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood criterion, Median Filter, Spatial Domain High-Pass Filtering. Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT-III

Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT-IV

Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, thresholding, Region Oriented Segmentation.

Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT-V

Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008 (Units 1, 2, 3)
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- MC GRAW HILL 2010(Units 3, 4, 5)

REFERENCE BOOKS:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools - ScotteUmbaugh, 2nd Ed, CRC Press, 2011
2. Digital Image Processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, MC GRAW HILL EDUCATION, 2010.
3. Digital Image Processing and Computer Vision – Somka, Hlavac, Boyle- Cengage Learning (Indian edition) 2008.
4. Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2 nd Edition.

(Program Elective-VI)

ADHOC AND SENSOR NETWORKS

IV Year - II Semester **Course Code: 18CS8T04**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. Understanding of wireless adhoc and sensor networks.
2. Enable to recognize the wide range of applicability of these networks
3. Provide them with an understanding of the major design issues including topics such as protocol mechanisms and resource constraints.

COURSE OUTCOMES:

1) Understand the Fundamental Concepts and applications of ad hoc and wireless sensor network
2) Describe the MAC protocol issues of ad hoc networks.
3) Describe routing protocols for ad hoc wireless networks with respect to TCP design issues.
4) Explain the concepts of network architecture and MAC layer protocol for WSN
5) Discuss the WSN routing issues by considering QoS measurements.

SYLLABUS

UNIT-I

Introduction to Ad Hoc Networks: Characteristics of MANETs, Applications of MANETs and challenges of MANETs - Routing in MANETs: Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms, Other routing algorithms.

UNIT-II

Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geocasting - TCP over Ad Hoc: TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT-III

Basics of Wireless Sensors and Applications: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

UNIT-IV

Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, **Sensor Networks and mobile robots -Security:** Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

UNIT-V

Sensor Network Platforms and Tools: Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms - Operating System: TinyOS - Imperative Language: nesC, **Dataflow style language:** TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P.Aggarwal, World Scientific Publications, March 2006, ISBN – 981-256-681-3 (Units 1,2,3)

2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)(Units 4, 5)

REFERENCE BOOKS:

1.Carlos De Morais Cordeiro, Dharma Prakash Agrawal “Ad Hoc & Sensor Networks: Theory and Applications”, World Scientific Publishing Company, 2nd edition, 2011.

2.Feng Zhao and LeonidesGuibas, "Wireless Sensor Networks", Elsevier Publication

3.Holger Karl and Andreas Willig “Protocols and Architectures for Wireless Sensor Networks”, Wiley, 2005 (soft copy available)

4.Kazem Sohraby, Daniel Minoli, &TaiebZnati, “Wireless Sensor Networks Technology, Protocols, and Applications”, John Wiley, 2007. (soft copy available)

5.Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.(soft copy available)

(Program Elective-VI)

HUMAN COMPUTER INTERACTION

IV Year - II Semester | Course Code: 18CS8T05

Lecture: 3 Practical: 0 | Internal Marks: 30

Credits: 3 Tutorial: 0 | External Marks: 70

COURSE OBJECTIVES:

1. Explain the capabilities of both humans and computers from the viewpoint of human information processing.
2. To make the student think constructively and analytically about how to design and evaluate interactive technologies.

COURSE OUTCOMES:

1) Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.
2) Apply an interactive design process and universal design principles to designing HCI systems.
3) Understand the importance of Natural Languages in computing interactions.
4) Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.
5) Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.

SYLLABUS

UNIT-I

Introduction: Usability of Interactive Systems- introduction, usability goals and measures, usability motivations, universal usability, goals for our profession.

Managing Design Processes: Introduction, Organizational design to support usability, Four pillars of design, development methodologies, Ethnographic observation, Participatory design, Scenario Development, Social impact statement for early design review, legal issues.

UNIT-II

Menu Selection, Form Fill-In and Dialog Boxes: Introduction, Task- Related Menu Organization, Single menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays

UNIT-III

Command and Natural Languages: Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large

UNIT-IV

Quality of Service: Introduction, Models of Response-Time impacts, Expectations and attitudes, User Productivity, Variability in Response Time, Frustrating Experiences Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display Design, Web Page Design, Window Design, Color

UNIT-V

User Documentation and Online Help: Introduction, Online Vs Paper Documentation, Reading from paper Vs from Displays, Shaping the content of the Documentation, Accessing the Documentation, Online tutorials and animated documentation, Online communities for User Assistance, The Development Process.

TEXT BOOKS:

1. Designing the User Interface, Strategies for Effective Human Computer Interaction, 5ed, Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, Pearson (Units 1, 2, 3, 4)

2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech. (Unit 5)

REFERENCE BOOKS:

1. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.

2. Designing the user interface. 4/e, Ben Shneidermann , PEA.

3. User Interface Design, Soren Lauesen , PEA.

4. Interaction Design PRECE, ROGERS, SHARPS, Wiley.

(Program Elective-VI)

ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS

IV Year - II Semester **Course Code: 18CS8T06**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

Students will try to learn:

1. To conceptualize the basic ideas and techniques underlying the design of intelligent systems.
2. To make students understand advanced representation formalism and search techniques.
3. Develop the skills to gain a basic understanding of artificial neural networks

COURSE OUTCOMES:

1. Develop a basic understanding of AI building blocks presented in intelligent agents.
2. Choose an appropriate problem solving method and knowledge representation technique for searching.
3. Represent & Reasons logical Agents.
4. Use neural networks for practical applications such as Pattern Recognition problem
5. Apply appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications

SYLLABUS

UNIT-I

Introduction: AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT–II

Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search, A* search Game Playing: Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

UNIT–III

Knowledge Representation & Reasons logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in proposional logic, Resolution, Forward & Backward Chaining. First

order logic. Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

UNIT–IV

Characteristics of Neural Networks, Historical Development of Neural Networks Principles, Artificial Neural Networks: Terminology, Models of Neuron, Topology, Basic Learning Laws, Pattern Recognition Problem, Basic Functional Units, Pattern Recognition Tasks by the Functional Units.

UNIT–V

Feed forward Neural Networks:

Introduction, Analysis of pattern Association Networks, Analysis of Pattern Classification Networks, Analysis of pattern storage Networks. Analysis of Pattern Mapping Networks.

Feedback Neural Networks: Introduction, Analysis of Linear Auto associative FF Networks, Analysis of Pattern Storage Networks

TEXT BOOKS :

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education. (Units 1, 2)
2. Artificial Neural Networks B. Yagna Narayana, PHI (Units 3, 4, 5)

REFERENCES :

1. Artificial Intelligence , 2nd Edition, E.Rich and K.Knight (TMH).
2. Artificial Intelligence and Expert Systems – Patterson PHI.
3. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.
4. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education.
5.Neural Networks Simon Haykin PHI
6. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition.

MAJOR PROJECT

IV Year - II Semester **Course Code: 18CS8L22**

Lecture: 0 Practical: 6 **Internal Marks: 40**

Credits: 8 Tutorial: 0 **External Marks: 60**

- **The Student takes up a project work along with the four subjects mentioned. The project shall have two evaluations**
  - Internal Evaluation – Continues Internal evaluation will be done for 40 Marks
  - External Evaluation – Will be performed by an External Examiner for 60 Marks

Open Elective Syllabus

Employability Skills: Competitive Coding

Open Elective I

Lecture: 2 Practical: 2 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

COURSE OBJECTIVES:

2) To give an understanding of programming concepts.
3) To get the student prepared for various coding contests conducted as part of their recruitment process

COURSE OUTCOMES:

1) Understand and Apply the fundamental concepts of various programming Languages.
2) Apply Recursion to various problems.
3) Assess the Efficiency of Algorithms.
4) Apply Search and Sort Techniques.
5) Apply Data Structures for Problem Solving.

SYLLABUS

Unit I:
What is Competitive Programming, Various Programming Contests?
Programming Techniques: Programming Language Features, Input & Output, Working with Numbers, Control Structures, Understanding and displaying various patterns, shortening the code: Examples

Unit II:
Recursive Algorithms: Generating Subsets, Generating Permutations, Backtracking, Bit Manipulations, Representing Sets. Examples

Unit III:
Algorithm Efficiency: Time complexity, Rules for calculating Time complexity, calculating Time complexity, Estimating Efficiency of Algorithms: Examples

Unit IV:
Sorting and Searching: Implementing the sorting Algorithms, Solving problems by sorting-Scheduling events, Tasks and Deadlines, Implementing Binary Search, Finding the optimal solutions: Examples

Unit V:

Data Structures: Applying Linear and Non Linear Data Structures: Stacks, Queues, Linked Lists, Priority Queues, Hash Tables, Trees, Graphs - Examples

Programming Languages to Discuss: C , C++, Java

Students must solve at least 100 problems in CodeChef / HackerRank, etc. The category may be under Easy / Medium. Problems to be solved in C,/C++/ Java or Python.

A minimum of 10 problems shall be solved per week in either CodeChef / HarckerRank, etc. The contests hosted in CodeChef / HackerRank, etc,. may be taken as day to day assessment of laboratory which will be evaluated for 30 Marks The work will be carried out in the laboratory slot allotted as well as at the home. Final Evaluation shall be done internally for 70 Marks.

TEXTBOOKS & REFERENCES

1) Halim, Steven and Halim, Felix, Competitive Programming 3, 2013.
2) Ahmed Shamsul Arefin, Art of Programming Contest, ACMSolver, Second Edition, 2012
3) Programming Challenges: The Programming Contest Training Manual By Steven S Skiena, Miguel A. Revilla
4) Guide to Competitive Programming: Learning and Improving Algorithms Through Contests By Antti Laaksonen
5) Cracking the Coding Interview 6th Edition. GAYLE LAAKMANN MCDOWELL
6) C++ Complete Reference- 4th Edition- Herbert Schildt- TMH
7) Introduction to Programming Languages - Arvind Kumar Bansal.

COMPUTER NETWORKS

Open Elective II

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
2) Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3) Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4) Learn various IEEE standards for medium access.
5) Recognize different network connecting devices.

COURSE OUTCOMES:

1) Independently enumerate the layers of the OSI model and TCP/IP
2) Identify the different types of network topologies and protocols.
3) Compare and contrast methods to identify Errors and correct them.
4) Differentiate between various network routing algorithms.
5) Understand WWW and HTTP Architectures.

SYLLABUS

UNIT–I

Introduction: OSI overview, TCP/IP and other networks models, Examples of Networks: Arpanet, Internet, Network Topologies Wide Area Networks(WAN), Local Area Networks(LAN), Metropolitan Area Networks(MAN).

UNIT–II

Physical Layer and overview of PL Switching: Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT–III

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet checksum, services provided to Network.

Elementary Data Link Layer protocols: Simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. **Sliding window protocol**: One bit, Go-back N, Selective Repetitive protocol, Stop and wait protocol.

UNIT – IV

Random Access: ALOHA, MAC addresses, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: Frequency Division Multiple Access(FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access(CDMA).

Network layer: Shortest Path, Distance Vector Routing Algorithm, Hierarchal routing algorithm

UNIT–V

Application layer (WWW and HTTP): WWWARCHITECTURE: Client (Browser),Server, Uniform Resource Locator, Resource Record, HTTP: HTTP Transaction, HTTP Operational Model and Client/Server Communication, HTTP Request Message Format, HTTP Response Message Format.

TEXT BOOKS:

1. Data Communications and Networks – Behrouz A. Forouzan. Third Edition TMH.
Units 1,2,4)
2**.** Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education (Units 1, 3, 5)

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

SOFTWARE PROJECT MANAGEMENT

Open Elective

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
2) To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3) To understand successful software projects that support organization's strategic goals

COURSE OUTCOMES:

1) Understand the basic concepts and issues of software project management
2) Gain knowledge on effective planning and estimation of software projects.
3) Understand the importance of Risk Management in software Projects.
4) Select and employ mechanisms for tracking the software projects
5) Understand Process and Product Quality metrics

SYLLABUS

UNIT-I

Introduction: Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure.

UNIT-II

Project Approach: Software Lifecycle models, Lifecycle phases

Effort estimation: Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation

UNIT-III

Activity Planning: Activity Identification Approaches, Network planning models, Critical path analysis.

Risk Management: Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

UNIT-IV

Project Monitoring & Control, Resource Allocation: Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

Managing People &Organizing Teams: Oldham-Hackman Job characteristics model, Influence of culture

UNIT-V

Software Quality: Planning Quality, Defining Quality - ISO 9126, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality, Quality plan of ACIC project

TEXT BOOKS:

1. Software Project Management in practice, Pankaj Jalote, Pearson. (Units 1, 2, 3, 4, 5)
2. Software Project Management, Walker Royce: Pearson Education (Units 4, 5)

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA McGraw-Hill
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Quality, Ben-Menachem ,Marliss

COMPUTER ORGANIZATION & ARCHITECTURE

Open Elective III

Lecture: 2	Practical: 0	Internal Marks: 30
Credits: 2	Tutorial: 0	External Marks: 70

PREREQUISITES: -DLD

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Understand the architecture of a modern computer with its various processing units.

2. Understand RTL, micro operations, instruction cycle

3. Understand the features of hardwired and micro programmed control units.

4. Analyze the memory hierarchy system and performance improvement by cache memory.

5. Analyze the communication methods of I/O devices and standard I/O interfaces.

SYLLABUS:

UNIT I:

Basic Structure of Computers: Computer Types, Functional unit, Basic Operational concepts, Bus structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating – Point Representation. Other Binary Codes, Error Detection codes. Performance, The history of computer development.

UNIT II:

Register Transfer Language And Micro Operations: Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shiftmicro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Register, Computer instructions, Timing and control, Instruction cycle, Memory – Reference Instructions. Input –Output and Interrupt.

UNIT III :

Central Processing Unit: Stack Organization**,** Instruction formats, Addressing modes, Data Transfer and Manipulation Instructions, Program control Instructions.

Control Unit: Control Memory, Hard wired control, Micro programmed control and Micro Instruction Format, Address Sequencing, Design of Control Unit.

UNIT IV:

Memory Organization:

Memory Hierarchy, Primary Memory, Introduction to Secondary Memory, Associative Memory, Cache Memory, virtual Memory, Memory Management hardware.

UNIT V:

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access, IOP, Serial Communication.

TEXT BOOKS

1.M.Morris Mano, ―Computer Systems Architecture, Pearson Education publishers, 3rd edition.
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky, ―Computer Organization, TMH publications, 5th edition, 2002.

REFERENCE BOOKS:

1. William Stallings, ―Computer Organization and Architecture, Pearson/PHI publishers, 6th edition, 2004.
2. Andrew S. Tanenbaum, ―Structured Computer Organization, Pearson/PHI publishers, 4th edition, 2005.
3.John D Carpinelli, ―Computer Systems Organization and Architecture‖, Pearson Education, 1st edition, 2001

INTERNET OF THINGS

Open Elective IV

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Understand the architecture of Internet of Things and connected world.
2) Explore on use of various hardware, communication and sensing technologies to build IoT applications.
3) Develop the real time IoT applications to make smart world.
4) Understand challenges and future trends in IoT.

COURSE OUTCOMES:

1) Design and Deployment of IoT.
2) Design and comparing M2M with IoT
3) Understand Platform design and modeling of IoT
4) Apply IoT in different devices using Python
5) Implement IoT and cloud platforms

SYLLABUS

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT Enabling Technologies, IoT levels and deployment, domains Specific IoTs.

UNIT-II

IoT AND M2M : Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model. Logical design using Python: Installing Python, Python data types and data Structures, control flow, functions, modules, packages, file handling.

IoT Physical Devices and Endpoints: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-IV

IoT Protocols: Messaging Protocols- MQ Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) Transport Protocols-Light Fidelity(Li-Fi), Bluetooth Low Energy(BLE)

IoT Protocols: Addressing and Identification: Internet Protocol Version 4(IPV4), Internet Protocol Version 6(IPV6), Uniform Resource Identifier (URI)

UNIT-V

IoT Physical Servers And Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

TEXT BOOKS:

1) ArshdeepBahga, Vijay Madisetti, "Internet of Things: A Hands-on-Approach", VPT, 1stEdition, 2014.(Units 1,2,3,5)
2) Matt Richardson, Shawn Wallace, "Getting Started with Raspberry Pi", O'Reilly (SPD), 3rdEdition, 2014.(Unit 3)
3) Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram " Internet of Things" Wiley(Unit 4)

REFERENCE BOOKS:

1) Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2) Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", John Wiley andSons2014.

OPERATING SYSTEMS

Open Elective V

Lecture: 3 Practical: 0 Internal Marks: 30

Credits: 3 Tutorial: 0 External Marks: 70

PREREQUISITES: -

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1.Understand the functionalities of an operating system and Evaluate different CPU scheduling algorithms.

2. Apply synchronization to cooperating processes and handle the deadlocks

3. Learn various management techniques for efficient utilization of system memory.

4. Understand and analyze theory andimplementation offiles and Evaluate different disk scheduling algorithms.

5. Analyze the functionalities in various operating systems.

SYLLABUS:

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

Process Management – Process concept, the process, Process State Diagram, Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Inter process Communication, Scheduling-Basic Concepts, Scheduling Criteria, and Scheduling Algorithms.

UNIT-II:

Concurrency: Process Synchronization, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-III:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT V:

Linux System: Components of LINUX, Inter process Communication, Synchronization, Interrupt, Exception and System Call.

Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.

2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.

3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.

2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.

3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.