

# **B.E. COMPUTER SCIENCE AND ENGINEERING**

## **SYLLABI**

**2017**

**(CHOICE BASED CREDIT SYSTEM)**

**(REGULAR PROGRAMME)**

**Department of Computer Science and Engineering**

**FACULTY OF ENGINEERING**



**KARPAGAM ACADEMY OF HIGHER EDUCATION**

*(Deemed to be University)*

*(Established Under Section 3 of UGC Act 1956)*

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**Receptive Skills (Listening, Reading and Scanning) & Productive Skills (Writing, Speaking and Representing) (8)**

**Listening** – Understanding the passage in English –Pronunciation practice. **Speaking** – Asking and answering questions. **Reading** – Critical reading – Finding key information in a given text (Skimming - Scanning). **Writing**– Coherence and cohesion in writing – Short paragraph writing – Writing short messages.

### **Grammar&Vocabulary (Function Grammar & Technical Vocabulary)**

WH questions –Yes/No Question - Subject Verb agreement. **Vocabulary**– Compound Nouns/Adjectives – Irregular verbs.

### **Unit - III            LSRW SKILLS & GRAMMAR**

#### **Receptive Skills (Listening, Reading and Scanning) & Productive Skills (Writing, Speaking and Representing) (8)**

**Listening** – Listening for specific task – fill in the gaps.**Speaking** – Phonemes – Syllables – Role play – Conversation Practice.**Reading** –comprehension passages based on general topics or matters of current affairs. **Writing** - Autobiographical writing & Biographical writing.

### **Grammar&Vocabulary (Function Grammar & Technical Vocabulary)**

Preposition – Infinitive &Gerund.**Vocabulary** – Foreign words used in English – British and American usage.

### **Unit- IV            LSRW SKILLS & GRAMMAR, CAREER ORIENTED**

#### **Receptive Skills (Listening, Reading and Scanning) & Productive Skills (Writing, Speaking and Representing) (10)**

**Listening** – Responding to questions – Reading in class for complete understanding and for better pronunciation. **Speaking** – Debate- Presentations in seminars.**Reading** – Making inference from the reading passage – Predicting the content of reading passages.**Writing** - Interpreting visual materials (tables, graphs, charts, etc) & Instruction writing.

### **Grammar&Vocabulary (Function Grammar & Technical Vocabulary)**

Sentence pattern – Voice (active and passive voice). **Vocabulary** – One word substitution.

### **Unit- V            LSRW SKILLS & GRAMMAR, FIELD WORK**

#### **Receptive Skills (Listening, Reading and Scanning) & Productive Skills (Writing, Speaking and Representing) (10)**

**Listening** –Distinction between native and Indian English (Speeches by TED and Kalam). **Speaking**- Extempore talk –Just-a-minute talk.**Reading**-Reading strategies–Intensive reading – Text analysis.**Writing**- Creative writing – Writing circulars and notices – Writing proposal.

### **Grammar&Vocabulary (Function Grammar & Technical Vocabulary)**

Direct and Indirect speech – Conditional sentences - Auxiliary verbs. **Vocabulary** – Abbreviations & Acronyms.

**Note:** Students shall have hands on training in improving listening skill in the language laboratory @ 2 periods per each unit.

**Total Hours-45**

**TEXT BOOK:**

1. Sangeeta Sharma , Meenakshi Raman Technical Communication: Principles And Practice  
2<sup>nd</sup> Edition OUP, New Delhi, 2015

**REFERENCES:**

1. Lakshminarayanan, K.R. & Murugavel, T. Communication Skills for Engineers SCITECH Publications, Chennai 2009
2. Rizvi Ashraf, M Effective Technical Communication Tata McGraw-Hill, New Delhi. 2007
3. Rutherford Andrea, J. Basic Communication Skills for Technology Pearson Education, New Delhi. 2006

**WEBSITES:**

1. [www.learnerstv.com](http://www.learnerstv.com) – Listening/ Speaking/ Presentation
2. [www.usingenglish.com](http://www.usingenglish.com) – Writing/ Grammar
3. [www.englishclub.com](http://www.englishclub.com) – Vocabulary Enrichment/ Speaking
4. [www.ispeakyouspeak.blogspot.com](http://www.ispeakyouspeak.blogspot.com) – Vocabulary Enrichment/ Speaking
5. [www.teachertube.com](http://www.teachertube.com) – Writing Technically
6. [www.Dictionary.com](http://www.Dictionary.com) – Semantic / Grammar

**COURSE OBJECTIVES:**

- To develop analyzing skills for solving different engineering problems.
- To understand the concept of Matrices.
- To remember the basics of differential calculus and its applications.
- To apply the problems in differential equations.
- To Create knowledge about vector differentiation.
- To study the algebraic manipulation

**COURSE OUTCOMES:**

- Acquire the basic knowledge and understanding of mathematics.
- Apply advanced matrix knowledge to engineering problems.
- Understand the concepts of differential calculus problems.
- Improve their ability in evaluating geometrical applications of differential calculus problems.
- To solve the problems by applying the differential Equations.
- Evaluating engineering problems involving vector differentiation.

**UNIT I        MATRICES****(12)**

Review of Matrix Algebra - Characteristic equation – Eigenvalues and Eigenvectors of a real matrix – Properties – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic forms – Reduction to canonical form through orthogonal reduction.

**UNIT II        DIFFERENTIAL CALCULUS****(12)**

Limits, Continuity (Concepts only)- Differentiation- Differentiation Techniques: standard formulae, product rule, quotient rule, chain rule, method of substitution, implicit functions and successive differentiation.

**UNIT III    GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS****(12)**

Curvature – centre, radius and circle of curvature in Cartesian co- ordinates – Evolutes – Envelope – Evolute as envelope of normals.

**UNIT IV    DIFFERENTIAL EQUATIONS****(12)**

Introduction to Ordinary differential equations: Linear ordinary differential equations of second and higher order with constant coefficients.

Introduction to Partial differential equations: Linear Partial differential equations of second and higher order with constant coefficients.

Vectors-Differentiation of vectors – scalar and vector point functions –vector operator – vector operator applied to scalar point functions: Gradient; vector operator applied to vector point functions:Divergence and curl; Physical interpretation of divergence and curl, solenoidal and irrotational vectors.

**TotalHours : 60**

**TEXT BOOKS:**

1. Hemamalini. P.T, Engineering Mathematics, McGraw Hill Education (India) Private Limited, New Delhi. 2014
2. Sundaram, V. Lakhminarayan,K.A. &Balasubramanian,R. Engineering Mathematics for first year. Vikas Publishing Home, New Delhi. 2006
3. Bali, N.P. & Manish Goyal,A Text Book of Engineering Mathematics,Laxmi Publications Pvt. Ltd., New Delhi,2014

**REFERENCES:**

1. Grewel . B. S.Higher Engineering Mathematics, Khanna Publications, New Delhi.2014
2. BhaskarRao. P. B, Sri Ramachary SKVS, BhujangaRao. MEngineering Mathematics IBS Publications, India.2010
3. Ramana. B.VHigher Engineering Mathematics, Tata McGraw Hill Publishing Company, New Delhi. 2007
4. ShahnazBathul Text book of Engineering Mathematics(Special Functions and Complex Variables PHI Publications, New Delhi.2009
5. Michael D. Greenberg Advanced Engineering Mathematics Pearson Education, India 2009

**WEBSITES :**

1. [www.efunda.com](http://www.efunda.com)
2. [www.mathcentre.ac.uk](http://www.mathcentre.ac.uk)
3. [www.intmath.com/matrices-determinants](http://www.intmath.com/matrices-determinants)
4. [www. Intmath.com/calculus/calculus-intro.php](http://www.Intmath.com/calculus/calculus-intro.php)

**COURSE OBJECTIVES:**

- To understand the properties of matter and thermodynamics with its applications.
- To introduce the concepts of light, laser and fiber optics for diverse applications.
- To study the fundamentals of quantum physics and their applications.
- To comprehend the properties of crystal and its various crystal structures.
- To study the basics of sound and ultrasonics with appropriate applications.
- To study the quantum mechanics.

**COURSE OUTCOMES:**

- Identify the elastic nature of materials and its thermodynamic properties.
- Infer the characteristics of laser and optical fibers for engineering applications.
- Develop the idea of quantum mechanics through applications.
- Identify the different atomic arrangements of crystals and its defects.
- Make use of the concepts of sound waves for medical applications.
- Illustrate the basic ideas of nuclear reactors for energy resources.

**UNIT I            PROPERTIES OF MATTER AND THERMODYNAMICS            (9)**

Three types of modulus of elasticity – basic definitions, relation connecting the moduli (Derivation), Poisson's ratio- Torsional pendulum- bending of beams - bending      moment – uniform and non uniform bending

Thermodynamics – laws of thermodynamics- concept of entropy- change of entropy in reversible and irreversible processes – refrigeration.

**UNIT II            LASER AND FIBER OPTICS            (9)**

Introduction – emission and absorption process- Einstein's coefficients derivation. Types of LASER -CO<sub>2</sub>, Semiconductor LASER- Applications of LASER in industry and medicine.Total internal reflection – modes of propagation of light in optical fibers – numerical aperture and acceptance angle –derivations, types of optical fibers (Material, refractive index and mode) – fiber optical communication system (block diagram)

**UNIT III            QUANTUM PHYSICS            (9)**

Introduction to quantum theory – Black body radiation- dual nature of matter and radiation – de Broglie wavelength, uncertainty principle – Schrödinger's wave equation – time dependent and time independent equations – particle in one dimensional box-physical significance of wave function, scanning electron microscope.

#### **UNIT IV      CRYSTAL PHYSICS**

(9)Lattice – unit cell – Bravais lattice – calculation of number of atoms per unit cell, atomic radius, coordination number, packing factor for SC, BCC, FCC and HCP structures- crystal defects – point, line and surface defects

#### **UNIT V      ULTRASONICS AND NUCLEAR PHYSICS      (9)**

Production of ultrasonics by piezoelectric method –Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C –scan displays, Medical applications – Sonogram  
Introduction – basics about nuclear fission and fusion–Radiation detectors – semi conductor detector.  
Reactors – essentials of nuclear reactor- power reactor.

**Total Hours- 45**

#### **TEXT BOOK:**

1. Ganesan.S and Baskar.T Engineering Physics I GEMS Publisher, Coimbatore-641 001, 2015

#### **REFERENCES:**

1. Serway and Jewett Physics for Scientists and Engineers with Modern Physics Thomson Brooks/Cole, Indian reprint, New Delhi 2010
2. Gaur, R.K. and Gupta, S.C Engineering Physics DhanpatRaiPublications,New Delhi. 2011
3. M.N. Avadhanulu and PG Kshirsagar A Text book of Engineering Physics S.Chand and company, Ltd., New Delhi 2011
4. D.C. Ghosh, N.C. Ghosh, P.K. HaldarEngineering Physics University Science, New Delhi 2011
5. P. Khare, A. SwarupEngineering Physics: Fundamentals and Modern Applications Jones & Bartlett Learning 2009

#### **WEBSITES:**

1. [www.nptel.ac.in](http://www.nptel.ac.in)
2. [www.physicsclassroom.com](http://www.physicsclassroom.com)
3. [www.oyc.yale.edu](http://www.oyc.yale.edu)
4. [www.physics.org](http://www.physics.org)

**\*common to semester 1 & 2**



Coal - Proximate and Ultimate analysis - Metallurgical coke - Manufacture by Otto-Hoffman method - Petroleum processing and fractions - Synthetic petrol - Bergius and Fischer-Tropsch method - Knocking -

Octane number and Cetane number - Gaseous fuels - Water gas, Producer gas, Combustion of fuel-  
Introduction-GCV-NCV-Flue gas analysis.

#### **UNIT IV      CORROSION SCIENCE      (9)**

Chemical and Electrochemical corrosion - Galvanic corrosion - Differential aeration corrosion - Corrosion control - Sacrificial anode and Impressed current cathodic methods - Corrosion inhibitors - Protective coatings – Organic coatings-Paints - Constituents and functions –Inorganic coatings- Metallic coatings - Electroplating (Au) and Electro less plating (Ni) - Surface conversion coating - Hot dipping-Anodizing of Al

#### **UNIT V      SURFACE CHEMISTRY AND PHASE RULE      (9)**

Introduction-Adsorption-Types, adsorption of gases on solids, adsorption of solutes from solutions, Adsorption isotherms-Freundlich adsorption isotherm-Langmuir adsorption isotherm- Role of adsorbents in industries (catalysis and water softening).

Phase Rule: Definition -Phase diagrams – one component water system, two component Ag-Pb system.

**Total Hours: 45**

#### **TEXT BOOKS:**

1. Dr. Vairam.S.EngineeringChemistryGems Publishers, Coimbatore.2014
2. Dr.Ravikrishnan.A.Engineering Chemistry I &II Sri Krishna Hi tech Publishing Company (P) Ltd., Chennai.2012

#### **REFERENCES:**

1. Raman Sivakumar Engineering Chemistry I &II McGraw-Hill Publishing Co.Ltd., 3<sup>rd</sup> Reprint NewDelhi. 2013
2. Kuriakose. J.C. and Rajaram Chemistry in Engineering and Technology. Vol. I &II 5<sup>th</sup> edition.
3. Tata McGraw Hill Publishing Company, New Delhi. 2010
4. Jain, P.C. and Monika Jain Engineering Chemistry. DhanpatRai Publishing Company (P) Ltd., New Delhi. 2009
5. Dara.S.S Text book of Engineering Chemistry. S.Chand&Co.Ltd., New Delhi 2008
6. Sharma.B. K Engineering Chemistry Krishna Prakasam Media (P) Ltd., Meerut 2001

#### **WEBSITES:**

1. <http://www.studynotes.ie/leaving-cert/chemistry/>
2. <http://www.rejinpaul.com/2011/04/engineering-chemistry-ii-second.html>
3. <http://www.learnerstv.com/Free-chemistry-Video-lectures-ltv044-Page1.htm>
4. <http://ocw.mit.edu/courses/#chemistry>
5. <http://www.chem.qmul.ac.uk/surfaces/sec>

**\*common to semester 1 & 2**

**COURSE OBJECTIVE:**

- Identify and understand the working of key components of a computer system.
- Identify and understand the various kinds of input-output devices and different types of storage media commonly associated with a computer
- Understand, analyze and implement software development tools like algorithm, pseudo codes and programming structure
- Study, analyze and understand logical structure of a computer program, and different construct to develop a program in 'C' language
- Write small programs related to simple/ moderate mathematical and logical problems in 'C'.
- Study, analyze and understand simple data structures and how to use it in C language

**COURSE OUTCOMES:**

- Develop algorithms for mathematical and scientific problems
- Explore alternate algorithmic approaches to problem solving
- Understand the components of computing systems
- Choose the structures to solve mathematical and scientific problem
- Write programs to solve real world problems using object oriented features
- Use different data structures and create / manipulate basic data files and developing applications for real world problems.

**UNIT I INTRODUCTION****(9)**

General problem solving concepts, approaches and challenges, problem solving with computers, problem solving tools: flowcharts, algorithms, data structures, Pseudo code. Various Approaches: Solve by analogy, Decompose the task into smaller subtasks, Building block approach, Merging solutions, Algorithmic thinking, Choice of appropriate data structures, Implementation of the Pseudo-code, implementing the code, Testing the solution

**UNIT II FUNDAMENTAL ALGORITHMS****(9)**

Exchanging the Values – Counting – Summation of Set of Number – Factorial Computation – Sine Computation – Fibonacci Sequence – Reversing the Digits of an Integer – Base Conversion – Character to Number Conversion- Algorithm Comparison

**UNIT III FACTORING METHODS****(9)**

Finding the Square Root of a Number – Smallest Divisor of an Integer – GCD of Two Integers – Generating Prime Numbers – Computing the Prime Factors of an Integer – Generation of Pseudo-Random Numbers – Raising a Number to a Large Power – Computing the Nth Fibonacci Number- Algorithm Comparison

**UNIT IV ARRAY TECHNIQUES****(9)**

Array Order Reversal – Array Counting or Histogramming – Finding the Maximum Number in a Set – Removal of Duplicates from an Ordered Array – Partitioning an Array – Finding the kth Smallest Element– Longest Monotone Subsequence- Algorithm Comparison

## **UNIT V      MERGING, SORTING AND SEARCHING**

**(9)**

Two Way Merge - Sorting by Selection, Exchange, Insertion, and Partitioning - Binary Search – Hash Searching- Algorithm Comparison

**Total Hours: 45**

### **TEXTBOOK**

1. Dromey R G, “How to Solve it by Computer”, Pearson India, 1<sup>st</sup> Edition, 2007

### **REFERENCES**

1. Michael Schneider, Steven W. Weingart, David M. Perlman, “An Introduction to Programming and Problem Solving with Pascal”, Wiley Eastern Limited, New Delhi, 1982.
2. Harold Abelson and Gerald Sussman with Julie Sussman, “Structure and Interpretation of Computer Programs”, MIT Press, 1985.

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics

Number systems – binary codes - logic gates - Boolean algebra, laws & theorems- simplification of Boolean expression - implementation of Boolean expressions using logic gates - standard forms of Boolean expression.

**Total Hours: 45**

**TEXT BOOKS**

1. Mittle, V.M Basic Electrical Engineering Tata McGraw Hill Edition, New Delhi 2004
2. Sedha R.S Applied Electronics S. Chand & Co 2006

**REFERENCES**

1. Muthusubramanian R, and Muraleedharan K A Basic Electrical, Electronics and Computer Engineering Tata McGraw Hill, Second Edition 2006
2. Nagsarkar T K and Sukhija M S Basics of Electrical Engineering Oxford press 2005
3. Mahmood Nahvi and Joseph A. Edminister Electric Circuits Schaum' Outline Series, McGraw Hill 2002
4. Premkumar N Basic Electrical Engineering Anuradha Publishers 2003

**COURSE OBJECTIVE**

- To provide students with practical knowledge of quantitative analysis of materials
- Provide details of analysis done by classical and instrumental methods
- Study concepts of developing experimental skills in building technical competence.
- Study various conductometric and potentiometric titrations on various chemicals
- Determination of molecular weight and degree of polymerization
- Determination of corrosion rate by weight loss method.

**COURSE OUTCOMES**

Upon completion of this course, the students will be able to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time
- Measure molecular/system properties such as surface tension, viscosity
- Determine conductance of solutions, redox potentials, chloride content of water, etc
- Synthesize a small drug molecule and analyse a salt
- Understand all the concepts experimental skills in building technical competence.
- Understand various conductometric and potentiometric titrations on various chemicals

**LIST OF EXPERIMENTS – CHEMISTRY**

1. Estimation of alkalinity of Water sample.
2. Estimation of hardness of Water by EDTA
3. Estimation of chloride in Water sample (Argentometric method)
4. Determination of corrosion rate by weight loss method.
5. Conductometric Titration (Simple acid base).
6. Conductometric Titration (Mixture of weak and strong acids).
7. Conduct metric Titration using  $\text{BaCl}_2$  vs  $\text{Na}_2\text{SO}_4$ .
8. pH Titration (acid & base).
9. Potentiometric Titration ( $\text{Fe}^{2+}$  /  $\text{KMnO}_4$  or  $\text{K}_2\text{Cr}_2\text{O}_7$ ).
10. Estimation of Ferric ion by Spectrophotometry.
11. Determination of water of crystallization of a crystalline salt (Copper sulphate).
12. Determination of molecular weight and degree of polymerization using Viscometry.
13. Determination of chemical oxygen demand.

**Total Hours: 45**

**\*common to semester 1 & 2**

**17BEPH111, 17BEPH211ENGINEERING PHYSICS LABORATORY**

L	T	P	C
0	0	4	2

**COURSE OBJECTIVES:**

- To develop basic laboratory skills and demonstrating the application of physical principles.
- To prepare for the lab experiment and perform individually a wide spectrum of experiments.
- To present experimental data in various appropriate forms like tabulation, and plots.
- To analyze, Interpret and Summarize experimental results.
- To communicate clearly understanding of various experimental principles, instruments/setup, and procedure
- To learn the bandgap of semiconductor

**COURSE OUTCOME:**

Upon completion of this course the students will be able to:

- The students will have the knowledge on Physics practical experiments and that knowledge will be used by them in different engineering and technology applications.
- Prepare for the lab experiment and perform individually a wide spectrum of experiments.
- Present experimental data in various appropriate forms like tabulation, and plots.
- Analyze, Interpret and Summarize experimental results.
- Communicate clearly understanding of various experimental principles, instruments/setup, and procedure.
- Prepare to develop the skills for understanding basic electric circuits.

**LIST OF EXPERIMENTS – PHYSICS**

1. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
2. Determination of wavelength of mercury spectrum – spectrometer grating.
3. Determination of Young's modulus of the material – Non uniform bending (or) Uniform bending.
4. Determination of Viscosity of liquid – Poiseuille's method.
5. Spectrometer Dispersive power of a prism.
6. Torsional pendulum – Determination of Rigidity modulus.
7. Particle size determination using Diode Laser
8. Determination of Laser parameters – Wavelength, and angle of divergence.
9. Determination of acceptance angle in an optical fiber.
10. Determination of thickness of a thin wire – Air wedge method
11. Determination of Band Gap of a semiconductor material.
12. Determination of Specific resistance of a given coil of wire – Wheatstone Bridge

**Total Hours: 45****\*common to semester 1 & 2**



**17BECS112**

**ENGINEERING GRAPHICS**

**L T P C**

**1 0 3 3**

**COURSE OBJECTIVES:**

- To understand the importance graphics in engineering
- To learn basic engineering drawing formats
- To develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings.
- To learn to take data and transform it into graphic drawings.
- To prepare the students to communicate effectively and to use the techniques, skills
- Discuss about modern engineering tools necessary for engineering practice

**COURSE OUTCOMES:**

Upon completion of this course the students will be able to:

- Know and understand the conventions and the method of engineering drawing.
- Interpret engineering drawings using fundamental technical mathematics.
- Construct basic and intermediate geometry.
- Improve their visualization skills so that they can apply these skills in developing new products.
- Improve their technical communication skill in the form of communicative drawings.
- Comprehend the theory of projection.

**UNIT I INTRODUCTION**

**(9)**

Introduction to Engineering Drawing, Bureau of Indian Standards (BIS), Layout of drawing sheets, sizes of drawing sheets, different types of lines used in drawing practice geometric constructions, principles of dimensioning– linear, angular, aligned system, unidirectional system, parallel dimensioning, chain dimensioning, location dimension and size dimension.

**UNIT II SCALES AND PLANE CURVES**

**(8)**

SCALES:Reducing Scale, Enlarging Scale, Plain Scale, Diagonal Scale and Vernier Scale. Conics – Construction of Ellipse, Parabola and Hyperbola by eccentricity method

**UNIT III FREE HAND SKETCHING**

**(9)**

Representation of Three Dimensional objects – General principles of orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

**UNIT IV PROJECTION OF POINTS, LINES AND PLANE SURFACES**

**(8)**

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations – Traces–Projection of polygonal surface and circular lamina inclined to both reference planes.

## **UNIT V      PROJECTION OF SOLIDS      (8)**

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

## **Introduction to Drafting Software/Package (Not for Exam)      (3)**

Basic operation of drafting packages, use of various commands for drawing, dimensioning, editing, modifying, saving and printing/plotting the drawings. Introduction to 3D primitives.

**Total Hours: 45**

### **TEXT BOOKS**

1. Venugopal K and Prabhu Raja V Engineering Graphics New Age International Publishers 2007
2. VTU A Primer on Computer Aided Engineering Drawing Belgaum 2006

### **REFERENCES**

1. Kumar M S Engineering Graphics D D Publications, Chennai 2007
2. Bureau of Indian Standards Engineering Drawing Practices for Schools and Colleges SP 46-2003 BIS, New Delhi 2003
3. Luzadder W J Fundamentals of Engineering Drawing Prentice Hall Book Co., New York 1998

### **WEBSITES**

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 and 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 and SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 and SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

## 17BECS113 COMPUTER PRACTICE AND PROGRAMMING

L T P C

### LABORATORY

1 0 4 3

#### COURSE OBJECTIVES:

- Study various tools like Text editor, Spread sheet and Power point presentation
- Determine methods to draw flowcharts and write Algorithms
- Provide methods to design and develop C problem solving skills
- Determine methods to trace and debug a program
- Determine methods to write C programs using functions and arrays
- Determine to use concepts of pointers,structures and files to write C programs

#### COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Ability to use Text editor, Spread sheet and Power point presentation
- Ability to draw flowcharts and write Algorithms
- Ability to design and develop C problem solving skills
- Ability to trace and debug a program
- Ability to write C programs using functions and arrays
- Ability to use concepts of pointers,structures and files to write C programs

#### THEORY:

What is computer- Computer Components- What is C- C Character set- Constants, Variables and Keywords-General form of C Program - Relational and Logical Operators - Selection Structures- If and nested if - Switch Case - Loops-Definition and types- Functions- Arrays- Introduction to Strings-Pointers.

#### PRACTICALS:

1. Working with word Processing, Spreadsheet and presentation software in Linux
2. Programming in Scratch:  
Practicing fundamental concepts of programming like sequence, selection decision statements, working of loops and event driven programming
3. C Programming:  
Practicing programs to get exposure to basic data types, algebraic expressions, Conditional statements, Input and Output Formatting, Decision Statements, Switch Case, Control structures, arrays, Strings and function, implementation of pointers.

**Total Hours: 45**

#### REFERENCES:

1. E. Balagurusamy, “ Computing Fundamentals and C Programming”, TMH Education, 5<sup>th</sup> Edition, 2014
2. Yashavant Kanetkar, “ Let us C”, BPB Publications, 13<sup>th</sup> Edition, 2013.

**COURSE OBJECTIVES:**

- To help students comprehend the role of listening skills in effective communication.
- To familiarize students with verbal and non-verbal communication.
- To expose students to neutral accent.
- To develop emotional intelligence skills in them for enhancing their self-esteem.
- To assist them in setting goals and developing positive attitude.
- To enable students to acquire decision making skills, problem solving skills and assertive skills.

**COURSE OUTCOMES:**

Students undergoing this course will be able to

- Design and deliver a persuasive presentation that convinces the audience of the topic's relevance and overcomes resistance,
- Use appropriate visual support and adhering to a specified time limit.
- Use a strategic communication model and critical thinking to identify objectives, analyze audiences, and choose the most effective structure and style for delivering strategically sound written and spoken messages.
- Practice principles of effective business writing and document design in all written documents.
- Build an understanding of different organizational cultures, business practices, and social norms to communicate more effectively in domestic and cross-cultural business contexts.
- Develop their soft skills and inter personal skills, which will make the transition from college to workplace smoother and help them excel in their job.

**UNIT I (9)**

What is Business Communication? - Types of Communication – Formal and informal communication – Process of Communication- modes of Communication – Barriers to communication.

**UNIT II (9)**

Written Business Communication – Style- word-usage- organisation of Ideas – mechanics of writing and fill up of forms - Cover Letter- Letter for Job Application- Letter of Complaint - Memos - Resumes - Email- Reports Revising and proofreading- Advertising slogans- jargons- Description of Graphics and visual aids - interpretation of graphs using expressions of comparison and contrast .

**UNIT III (9)**

Reading and Understanding the news articles - Oral Business Communication - First Impressions - Attire – Effective Presentation strategies- Nuances of delivery – Controlling nervousness and stage fright- Visual aids Presentations- Capturing Audience - Tone - Behavior - Telephone Etiquette- Non - verbal communication - Eye contact - Facial expressions - Posture - Gestures - Body language – Etiquette- Organization of presentation – brain storming- Negotiations.

## UNIT - IV

(9)

Difference between goals and dreams - SMART goal setting - 3 Ds of goal setting- Determination, Discipline and Direction - Developing the right attitude - Motivation - Intrinsic and Extrinsic motivation - Dealing with change - Dedication - Taking responsibilities - Decision making.

## UNIT – V

(9)

Intrapersonal skills - Self-analysis - Thought process – Interpersonal skills - Confidence building - Resolving conflicts- Analytical skills - Team Building - Leadership skills - Planning/organizing - Ability to work independently - Professional ethics - Communicating via e-mail. Ethical perspectives and their implications for responsible communication - Proposal Presentation

**Total Hours: 45**

### TEXT BOOK:

1. Meenakshi Raman ; Prakash Singh **Business Communication** Oxford University Press 2012

### REFERENCES:

1. Murthy, G .R. K. Soft Skills for Success. The ICFAI University Press, Hyderabad. 2008
2. Jagadeesan, G &Santanakrishnan,R. Soft Skills Development:Training and Evaluation. The ICFAI University Press, Hyderabad.2008
3. Sherfield, Robert M., Rhonda J. Montgomery, & Patricia G. MoodyDeveloping Soft Skills. Pearson Education, New Delhi.2005

### WEBSITES:

1. <http://tribehr.com/social-hr-software/talent-management/skills-tracking>
2. [www.ispeakyouspeak.blogspot.com](http://www.ispeakyouspeak.blogspot.com)
3. <https://alison.com/subjects/6/Personal-Development-Soft-Skills>
4. [www.learning-development.hr.toolbox.com](http://www.learning-development.hr.toolbox.com)
5. <http://www.niit.com/solution/soft-skill-training>
6. <http://mybcommlab.com> to test your understanding of the concepts presented in each chapter and explore additional materials that will bring the ideas to life in videos, activities, and an online multimedia e-book.

**COURSE OBJECTIVES:**

- To motivate learners to acquire listening & speaking skills in both formal and informal context.
- To focus on question forms & to make them understand the importance of using question tags and also the functional use of transformation of sentences.
- To improve their reading habit and to train them in critical and analytical reading.
- To equip them to write for academic as well as work place context.
- To enable students to face interviews.
- To study the receptive and productive skills

**COURSE OUTCOMES:**

Students undergoing this course will be able to

- Acquire second language: speaking convincingly
- Able to express their opinions clearly, negotiating and arguing using appropriate communicative strategies.
- Enhance their reading texts critically and analytically.
- Develop writing effectively, persuasively and producing different types of writing
- Able to perform narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
- Enrich the ability to face interviews with confidence.

**UNIT-1      LSRW SKILLS & GRAMMAR****Receptive Skills (Listening, Reading and Scanning) & Productive Skills (Writing, Speaking and Representing) (9)**

**Listening** - Difference between Hearing & Listening –Listening to informal conversation. **Speaking** - Spoken structures on different situations - Introduction, Greeting, Comments on topics like Films, Games etc, Excuse, Request, Agreement, Disagreement, etc., **Reading** – Extensive and Intensive reading. **Writing** – Report writing - Writing a covering letter.

**Grammar & Vocabulary (Function Grammar & Technical Vocabulary)**

Regular & Irregular verbs - Kinds of sentences - Question tags. Homonyms and Homophones.

**UNIT-II      LSRW SKILLS & GRAMMAR****Receptive Skills (Listening, Reading and Scanning) & Productive Skills (Writing, Speaking and Representing) (9)**

**Listening** – Note Taking- Improving grasping ability. **Speaking** – Welcome address - Vote of thanks - Master of ceremony. **Reading** – Active and Passive reading - Reading for vocabulary- Reading for a

purpose. **Writing** - Writing a review (Film review) - Summary of a story. **Grammar & Vocabulary (Function Grammar & Technical Vocabulary)**

Modal verbs – Conjunction - Expression of cause and effect. Phrasal verbs - Idioms.

### **UNIT – III LSRW SKILLS & GRAMMAR**

**Receptive Skills (Listening, Reading and Scanning) & Productive Skills (Writing, Speaking and Representing) (9)**

**Listening** - Barriers to listening (Physical, Psychological, Linguistic & Cultural). **Speaking** – Stress, Pause and Intonation. **Reading** – Rapid reading – Skimming, Scanning and Surveying. (SQ3R) **Writing** - Essay writing - Minutes of meeting - Agenda

**Grammar & Vocabulary (Function Grammar & Technical Vocabulary)**

Active and Passive voice - Purpose expression. Same words used as noun and verb - Often misspelt and confused words.

### **UNIT-IV LSRW SKILLS & GRAMMAR, CAREER ORIENTED**

**Receptive Skills (Listening, Reading and Scanning) & Productive Skills (Writing, Speaking and Representing) (9)**

**Listening** – Listening to telephone conversation - Viewing model interviews. **Speaking** – Group Discussion - Correlation between verbal & non - verbal communication. **Reading** – Reading comprehension (short & long text) - Reading job advertisements and profile of a company. **Writing** – Checklist preparation.

**Grammar & Vocabulary (Function Grammar & Technical Vocabulary)**

**Grammar** - Numerical expressions – Collocations. Singular and Plural (Nouns)

### **UNIT- V LSRW SKILLS & GRAMMAR, FIELD WORK**

**Receptive Skills (Listening, Reading and Scanning) & Productive Skills (Writing, Speaking and Representing) (9)**

**Listening** – Types of listening- Improving listening comprehension. **Speaking** - Oral presentation - Vocal communication techniques - Voice, quality, volume, pitch etc., **Reading** -Note making - Making notes from books/ any forms of writing materials. **Writing** - Describing process & products - Recommendation writing – Short essays writing-

**Grammar & Vocabulary (Function Grammar & Technical Vocabulary)**

Transformation of sentences (Simple, Compound & Complex). Collection of Technical Vocabularies with their meanings.

**Note:** Students shall have hands on training in improving listening skill in the language laboratory @ 2 periods per each unit.

**Total Hours: 45**

**TEXT BOOK:**

1. Sangeeta Sharma , Meenakshi Raman Technical Communication: Principles And Practice  
2<sup>nd</sup> Edition OUP, New Delhi. 2015

**REFERENCES:**

1. Lakshminarayanan, K.R. & Murugavel, T. Communication Skills for Engineers SCITECH Publications, Chennai 2008
2. Rizvi Ashraf, M Effective Technical Communication Tata McGraw-Hill, New Delhi.
3. 2007
4. Rutherford Andrea, J. Basic Communication Skills for Technology Pearson Education, New Delhi. 2006

**WEBSITES:**

1. [www.learnerstv.com](http://www.learnerstv.com) – Listening/ Speaking/ Presentation
2. [www.usingenglish.com](http://www.usingenglish.com) – Writing/ Grammar
3. [www.englishclub.com](http://www.englishclub.com) – Vocabulary Enrichment/ Speaking
4. [www.ispeakyouspeak.blogspot.com](http://www.ispeakyouspeak.blogspot.com) – Vocabulary Enrichment/ Speaking
5. [www.teachertube.com](http://www.teachertube.com) – Writing Technically
6. [www.Dictionary.com](http://www.Dictionary.com) – Semantic / Grammar



**OBJECTIVES:**

- To have knowledge in integral calculus.
- Determine mathematical tools needed in evaluating multiple integrals and their usage.
- Utilize Gauss, Stokes and Greens theorems to simplify calculations of integrals and prove simple results.
- Apply the knowledge of Mathematics in various Engineering fields by making them to identify the functions in engineering problems as analytic function and their analyze as a function of a complex variables.
- Develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence.
- To specify some difficult integration that appear in applications can be solved by complex integration in application areas such as fluid dynamics and flow of the electric current.

**COURSE OUTCOMES:**

- The student will be able to solve problems in Fluid Dynamics, Theory of Elasticity, Heat and Mass Transfer etc.
- The students will be able to understand mathematical tools needed to evaluate the areas and volumes using multiple integrals.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage. Use Gauss, Stokes and Greens theorems to simplify calculations of integrals and prove simple results.
- To find the Analytic functions using the Cauchy Riemann equations and they will learn mapping properties of elementary functions and mapping properties of some special transcendental functions.
- Students will understand relations between conformal mappings and quadratic differentials and how geometric structures are changing under conformal mappings.
- To evaluate complex integrals using the Cauchy integral formula and the residue Theorem and to appreciate how complex methods can be used to prove some important theoretical results.

**UNIT I INTEGRAL CALCULUS****(12)**

Definite and indefinite integrals – Substitution rule – Techniques of integration – Integration by parts - Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions – Improper Integrals.

**UNIT II MULTIPLE INTEGRALS****(12)**

Double integral – Cartesian coordinates – Polar coordinates – Area as double integrals- Change the order of integration – Triple integration in Cartesian co-ordinates.

### UNIT III VECTOR INTEGRATION

(12)

Integration of vectors – line integral- surface integral- volume integral- Green's theorem - Gauss divergence theorem and Stoke's theorems (Statement Only), hemisphere and rectangular parallelopipeds problems.

### UNIT IV ANALYTIC FUNCTIONS

(12)

Analytic functions - Cauchy-Riemann equations in Cartesian and polar forms – Sufficient condition for an analytic function (Statement Only) - Properties of analytic functions – Constructions of an analytic function - Conformal mapping:  $w = z+a$ ,  $az$ ,  $1/z$  and bilinear transformation.

### UNIT V COMPLEX INTEGRATION

(12)

Complex Integration - Cauchy's integral theorem and integral formula (Statement Only) – Taylor series and Laurent series - Residues – Cauchy's residue theorem (Statement Only) - Applications of Residue theorem to evaluate real integrals around unit circle and semi-circle (excluding poles on the real axis).

**Total Hours: 60**

### TEXT BOOKS:

1. Hemamalini. P.T Engineering Mathematics I & II McGraw-Hill Education Pvt.Ltd, New Delhi 2014
2. Grewal, B.S. Higher Engineering Mathematics Khanna Publishers, Delhi. 2014

### REFERENCES:

1. Erwin Kreyszig Advanced Engineering Mathematics. John Wiley & Sons. Singapore 2011
2. Venkataraman, M. K. Engineering Mathematics. The National Publishing Company, Chennai 2005
3. Narayanan. S, Manicavachagampillay.T.K and Ramaniah.G Advanced Mathematics for Engineering Students. Viswanathan S.(Printers and Publishers) Pvt. Ltd. Chennai. 2002
4. Michael D. Greenberg Advanced Engineering Mathematics Pearson Education, India 2009

### WEBSITES:

1. [www.efunda.com](http://www.efunda.com)
2. [www.mathcentre.ac.uk](http://www.mathcentre.ac.uk)
3. [www.sosmath.com/diffeq/laplace/basic/basic.html](http://www.sosmath.com/diffeq/laplace/basic/basic.html)
4. [www.mathworld.wolfram.com](http://www.mathworld.wolfram.com)

**COURSE OBJECTIVES:**

- To give a comprehensive insight into natural resources.
- To impart knowledge on ecosystem and biodiversity.
- To educate the ways and means of the environment.
- To protect the environment from various types of pollution.
- To impart some fundamental knowledge on human welfare measures.
- To motivate public to participate in environment protection and improvement.

**COURSE OUTCOMES:**

- Recognize the importance of natural resources (S).
- Associate themselves with the various ecosystems (S).
- Describe the importance of biodiversity (S).
- Identify and minimize the difference pollutions (S).
- Prioritize and analyses the social issues (S).
- Integrate the environmental principles in the projects undertaken in field of engineering and technology (A).

**UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL ESOURCES (9)**

Definition, Scope and Importance – Need for public awareness -Forestresources: Useandover-exploitation, deforestation- Water resources-Use and over-utilization of surface and ground water, floods, drought, conflicts over water- Land resources-Land as a resource, land degradation, man induced landslides, soil erosion and desertification –Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources- Food resources-World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture- Energy resources-Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources- role of an individual in conservation of natural resources.

**UNITII ECOSYSTEM(9)**

Chemistry and Environment- Environmental segments, Composition and Structure of atmosphere- Concept of an ecosystem- Structure, components and function of an ecosystem Energy flow in the ecosystem – Food chain, Food web and Ecological pyramids, Structure and function of Terrestrial ecosystem (Forest, Desert and Grassland ecosystem) and Aquatic ecosystem (Fresh water and Marine ecosystem)

**UNIT IIIBIODIVERSITY(9)**

Introduction to biodiversity, Definition-

Geneticdiversity, Speciesdiversity and Ecosystem diversity,Biogeographical classification of India, Imp ortance of biodiversity-Value of biodiversity - Hot Spots of biodiversity-Threats to biodiversity - Endangered and Endemic Species of India – Conservation of biodiversity- In-Situ and Ex-Situ conservation of biodiversity.

## **UNIT IV ENVIRONMENTAL POLLUTION(9)**

Definition – causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution and Thermal pollution. Solid waste management-causes, effects and control measures of urban and industrial wastes– Role of an individual in prevention of pollution–Disaster management-earthquake, tsunami, cyclone and landslides.

## **UNIT V SOCIAL ISSUES AND ENVIRONMENT (9)**

From Unsustainable to Sustainable development, Urban problems related to energy sources, Water conservation, Rain water harvesting and Watershed management, Resettlement and rehabilitation of people, its problems and concerns, Environmental ethics- Issues and possible solutions- Climate change- Green house effect and Global warming, Acid rain, Ozone layer depletion, Wasteland reclamation- Environment Protection Act- Human Rights- Value education, Role of Information Technology in Environment and Human health-Population growth, Variation of population among nations-Population explosion.

**Total Hours: 45**

### **TEXT BOOKS:**

1. Dr. Ravikrishnan, A Environmental Science Sri Krishna Hi tech Publishing Company Private Ltd., Chennai 2012
2. Anubhakaushik C.P. Kaushik Environmental Science and Engineering New Age International (P) Ltd., New Delhi. 2010

### **REFERENCES:**

1. William P. Cunningham Principles of Environmental Science Tata McGraw -Hill Publishing Company, New Delhi. 2008
2. Linda D. Williams Environmental Science Demystified Tata McGraw -Hill Publishing Company Ltd., New Delhi. 2005
3. Bharucha Erach Environmental Science Demystified Mapin Publishing (P) Ltd., Ahmedabad. 2005
4. Tyler Miller G. Jr Environmental Science Thomson & Thomson Publishers, New Delhi. 2004
5. Trivedi, R.K. and Goel, P.K Introduction to Air Pollution Techno-Science Publications, Jaipur. 2003

### **WEBSITES:**

1. <http://people.eku.edu/ritchison/envscinotes1.html>
2. <http://nptel.ac.in/courses.php?disciplineId=120>
3. [www.newagepublishers.com/samplechapter/001281](http://www.newagepublishers.com/samplechapter/001281).
4. [www.unesco.org/ext/field/beijing/scienceb.htm](http://www.unesco.org/ext/field/beijing/scienceb.htm), [www.infinitepower.org/education.htm](http://www.infinitepower.org/education.htm)
5. <http://www.sciencedaily.com/news/top/environment/>

**COURSE OBJECTIVES:**

- Identify and understand the working of key components of a computer system.
- Identify and understand the various kinds of input-output devices and different types of storage media commonly associated with a computer
- Understand, analyze and implement software development tools like algorithm, pseudo codes and programming structure
- Study, analyze and understand logical structure of a computer program, and different construct to develop a program in 'C' language
- Write small programs related to simple/ moderate mathematical and logical problems in 'C'.
- Study, analyze and understand simple data structures and how to use it in C language

**COURSE OUTCOMES:**

- Understanding the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer
- Write, compile and debug programs in C language and use different data types for writing the programs.
- Design programs connecting decision structures, loops and functions.
- Explain the difference between call by value and call by address.
- Understand the dynamic behavior of memory by the use of pointers.
- Use different data structures and create / manipulate basic data files and developing applications for real world problems.

**UNIT I INTRODUCTION TO C LANGUAGE****(8)**

Character Set, Variables And Identifiers, Keywords- Built-In Data Types- Arithmetic Operators And Expressions, Constants And Literals, Simple Assignment Statement- Basic Input/Output Statement-Simple 'C' Programs, usage of const keyword

**UNIT II CONDITIONAL STATEMENTS AND LOOPS****(8)**

Logical and Relational Operators- If Statement, If-Else Statement- Loops: While Loop, Do While, For Loop- Nested Loops, Infinite Loops- Switch Statement

**UNIT III ARRAYS****(9)**

One Dimensional Arrays- Array Manipulation; Searching, Insertion, Deletion Of An Element From An Array- Finding The Largest/Smallest Element In An Array- Two Dimensional Arrays, -Addition / Multiplication Of Two Matrices- Strings As Array Of Characters.

**UNIT IV POINTERS AND FUNCTIONS****(10)**

Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays Example Problems- Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion.

Structures – initialization - nested structures – structures and arrays – structures and pointers - union – typedef and enumeration types - bit fields - File Management in C – Files and Streams – File handling functions – Sequential access file- Random access file – Command line arguments.

**Total Hours: 45**

**REFERENCES:**

1. E. Balagurusamy, “ Computing Fundamentals and C Programming”, TMH Education, 5<sup>th</sup> Edition, 2014
2. Yashavant Kanetkar, “ Let us C”, BPB Publications, 13<sup>th</sup> Edition, 2013
3. H. M. Deitel and D. J. Deitel, „C: How to Program“, Prentice Hall, 7<sup>th</sup> Edition, 2012
4. E. Balagurusamy, “ Programming in ANSI C”, TMH Education, 6<sup>th</sup> edition, 2012

**COURSE OBJECTIVES:**

- Study various tools like Text editor, Spread sheet and Power point presentation
- Determine methods to draw flowcharts and write Algorithms
- Provide methods to design and develop C problem solving skills
- Determine methods to trace and debug a program
- Determine methods to write C programs using functions and arrays
- Determine to use concepts of pointers,structures and files to write C programs

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Ability to use Text editor, Spread sheet and Power point presentation
- Ability to draw flowcharts and write Algorithms
- Ability to design and develop C problem solving skills
- Ability to trace and debug a program
- Ability to write C programs using functions and arrays
- Ability to use concepts of pointers,structures and files to write C programs

**List of Experiments**

1. Write a C program to find Factorial of a given number using do while loop.
2. Write a C Program to print Fibonacci series using while loop.
3. Write a C Program to check a given number is Prime or Not.
4. Write a C Program to compute the sum of even numbers for a given n value.
5. Write a C Program to check the given string is Palindrome or Not.
6. Write a C Program to check the given number is Armstrong or Not using functions.
7. Write a C Program to count the number of vowels from the given string using switch case.
8. Write a C Program to read a line of text from keyboard and print the number of characters, words and spaces.
9. Write a C Program to print the student's record using structure.
10. Write a C Program to find factorial of a number using recursion function.

**Total Hours: 45**

**COURSE OBJECTIVES:**

- To identify and use of tools, types of joints in carpentry, fitting, tinsmithy and plumbing operations.
- To understand of electrical wiring and components.
- To Observe the function of lathe, shaper,
- To practice drilling, boring, milling, grinding machines.
- To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.
- To prepare students for handling the tools in engineering and furnace division

**COURSE OUTCOMES:**

Upon completion of this course the students will be able to:

- To identify different Tools required for Wood working.
- Familiarize the students to different cutting fluids.
- Use the Cutting tools required for Metal working in the Fitting work.
- Identify the need for heating of the Mild Steel and to understand the Hot Working of the metals in Black Smithy
- Demonstrate Manufacturing practices on CNC Machine tools.
- Expose different types of solid state welding and other welding practices viz Arc welding, Gas welding, Brazing, Soldering etc.

**PART – A (CIVIL & MECHANICAL)**

- 1. WELDING** (6)
  - i. Preparation of arc welding of butt joints, lap joints and tee joints.
- 2. BASIC MACHINING** (6)
  - i. Simple Turning and Taper turning
  - ii. Drilling and Tapping
- 3. SHEET METAL WORK** (6)
  - i. Model making – Trays, funnels, etc.
- 4. DEMONSTRATION ON** (4)
  - i. Smithy operations
  - ii. Foundry operations
  - iii. Plumbing Works
  - iv. Carpentry Works

**PART –B (ELECTRICAL & ELECTRONICS)**

- 5. ELECTRICAL ENGINEERING** (10)
  - i. Study of electrical symbols and electrical equipments.
  - ii. Construct the wiring diagram for Stair case wiring.



- iii. Construct the wiring diagram for Residential house wiring using switches, fuse, indicator, lamp and energy meter.
- iv. Measurement of electrical quantities – voltage, current, power & power factor in R load.
- v. Measurement of energy using single phase energy meter.

## **6. ELECTRONICS ENGINEERING**

**(13)**

- i. Study of Electronic components– Resistor (color coding), capacitors and inductors.
- ii. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
- iii. Study of logic gates AND, OR, NOT, NOR and NAND.
- iv. Study of HWR and FWR.

**Total Hours: 45**

## **REFERENCES**

1. Jeyachandran, K. and Balasubramanian, S A Premier on Engineering Practices Laboratory Anuradha Publications, Kumbakonam 2007
2. Jeyapoovan, T., Saravanapandian, M Engineering Practices Lab Manual Vikas Pupliching House Pvt. Ltd, Chennai 2006
3. Bawa, H.S Workshop Practice Tata McGraw – Hill Publishing Company Limited, New Delhi 2007

**COURSE OBJECTIVES:**

- To acquire the knowledge needed to test the logic of a program.
- To gain knowledge in the applications of expert system, in data base.
- To gain understanding on set theory and functions
- To provide understanding on various mathematical logics
- To provide adequate knowledge in class of functions, lattices and Boolean algebra
- To explain about Number theory and graph theory.

**COURSE OUTCOMES:**

- The student will gain the fundamentals about the logic of a programme.
- Be able to construct simple mathematical proofs
- Enrichment of the knowledge in applications of expert system, in data base.
- Gaining the adequate concepts in class of functions, lattices and Number theory
- Incrementally build sophisticated programs by a systematic design process based on discrete mathematics.
- Permutations and combinations and Graph Theory.

**UNIT- I      SET THEORY AND FUNCTIONS      (13)**

Basic concepts – Notation – Subset – The power set – Ordered pairs and Cartesian product – Relations on sets – Types of relations and their properties – Relation matrix and the graph of a relation – Equivalence relations – Composition of binary relations - Functions – Injective, Surjective, Bijective, Composition, Identity, Inverse and Characteristic function of a set – Permutation functions.

**UNIT -II      MATHEMATICAL LOGIC      (13)**

Basic connectives and truth tables – Tautologies – Logical equivalence and Implications – Propositional logic and First order Logic – Laws of logic – Rules of inference – The Predicate calculus – The Statement Function, Variables and Quantifiers – Predicate Formulas – Free and Bound Variables – The Universe of discourse.

**UNIT- III      LATTICES AND BOOLEAN ALGEBRA      (12)**

Lattices as Partially ordered sets – Hasse diagram – Some Properties of Lattices – Sublattices, Direct product and Homomorphism – Some Special Lattices - Boolean algebra – Definition and Examples.

**UNIT -IV      NUMBER THEORY                                  (12)**

Theory of Numbers – Prime – Composite – Perfect amicable numbers – The Sieve of Eratosthenes – Number of primes is infinite – Resolution of composite numbers in to prime factors – Divisor of a given number – Euler's function  $\phi(N)$  – Highest power of prime  $p$  contained in  $n!$  – Congruence – Fermat's theorem – Generalization of Fermat's theorem – Wilson's theorem – Lagrange's theorem.  
(Statements and simple problems only)

## UNIT – V      GRAPH THEORY (10)

Graphs and graph models – Graph terminology and special types of graphs – Representation graphs and graph-isomorphism – Connectivity – Matrix Representation of Graphs – Trees.

**Total Hours: 60**

**TEXT BOOKS:**

1. Tremblay, J. P. and Manohar, R. Discrete Mathematical Structures with Applications to Computer Science Tata McGraw–Hill Pub. Co. Ltd, New Delhi. 2008
2. Kenneth H Rosen Discrete Mathematics and its Applications with Combinations and Graph theory Tata McGraw - Hill Pub. Co. Ltd, New Delhi. 2012

## REFERENCES:

1. Bernard Kolman, Robert, C., Busby and Sharan Cutler Ross Discrete Mathematical Structures
2. Pearson Education Pvt. Ltd, New Delhi, Fifth Edition. 2006
3. Ralph P Grimaldi Discrete and Combinatorial Mathematics – An Applied Introduction Addison Wesley Publishing Company, USA, Fifth Edition 2006
4. Thomas Koshy Discrete Mathematics with Applications Elsevier Academic Press, New Delhi. 2012
5. NarsinghDeo Graph Theory with Applications to Engineering and Computer Science PHI Learning Pvt. Ltd., New Delhi. 2004
6. Krishnan V. K. Elementary Number Theory: A Collection of Problems With Solutions Universities Press, Hydrabad. 2012

## WEBSITES:

1. [www.dmtcs.org/dmtcs-ojs/index.php/dmtcs](http://www.dmtcs.org/dmtcs-ojs/index.php/dmtcs)
2. [www.mathworld.wolfram.com](http://www.mathworld.wolfram.com)
3. [www.nptel.com](http://www.nptel.com)

**COURSE OBJECTIVES:**

- To understand concepts about searching and sorting techniques
- To impart the basic concepts and the operations of data structures like Stacks, queues
- Discuss about linked lists and trees.
- To understand basic concepts of nonlinear data structures like stacks, trees and graphs.
- To analyze the given algorithms.
- To enable them to write algorithms for solving problems with the help of fundamental data structures

**COURSE OUTCOMES:**

- Able to understand the basic properties of data structures
- Able to identify the strength and weakness of data structures
- Able to implement Linear data structures for singly linked list, stack and Queue
- Design and implement the basic search and sorting algorithms
- Able to implement non linear data structures for Binary Trees
- Design and employ non linear data structure for solving graph application

**UNIT-1 Introduction to Data Structures and Algorithms (7)**

Arrays, Structures, Pointers to structures and Strings- Algorithm Development- Complexity Analysis- Recursion

**UNIT-II Linear Data Structures (9)**

Abstract Data Type(ADT)-Definition- List ADT – Linked List- Operations-Creation-Insertion-Deletion- Doubly Linked List- Stack ADT-Definition-Implementation - Operations and Applications-Queue ADT- Definition-Implementation, Operations and Applications

**UNIT-III Sorting and Searching (10)**

Bubble sort-Selection Sort-Insertion Sort-Merge Sort-Quick Sort- Running Time analysis of each sort – Linear Search-Binary Search-Hash Search Table

**UNIT-IV Non Linear Data Structures-I (10)**

Trees-terminologies- binary Tree-Applications-Tree Traversals-Search Trees- Binary Search Tree- AVL Trees- Operations and Applications- B-Trees

**UNIT-V Non Linear Data Structures-II (9)**

Graph-Definition-Terminologies- Graph Representations- Graph Traversals- Basic Algorithms- Shortest Path Algorithm- Minimum Spanning Tree Construction Algorithms-Prim's and Kruskal's- Bi-connectivity- Graph Applications

**Total Hours: 45**

**TEXT BOOKS:**

1. Mark Allen Weiss, “ Data Structures and Algorithm Analysis in C”, Pearson Education, 2<sup>nd</sup> Edition, 2011

**REFERENCES:**

1. Richard.F., Gilberg A, Behrouz A., Forouzan, “Data Structures- A Pseudocode Approach with C”, Thomson Brooks, 2<sup>nd</sup> Edition, 2008
2. AhoHopcroft and Ullman, “ Data Structures and Algorithms, Pearson Education, 4<sup>th</sup> Edition, 2009

**WEBSITES:**

1. <http://www.cs.auckland.ac.nz/software/AlgAnim/trees.html>
2. <http://www.itl.nist.gov/div897/sqg/dads/HTML/graph.html><http://www.cmpe.boun.edu.tr/~akin/cmpe223/chap2.htm>

**COURSE OBJECTIVES:**

- To learn the basics of binary number systems, Boolean functions and their simplification using K-map.
- To study, analyse and design combinational logic circuits
- To explain synthesis of the combinational circuits using HDL.
- The design issues of MSI devices are taught in detail
- To explain their synthesis using HDL are learnt.
- To study, analyze and design sequential circuits.

**COURSE OUTCOMES:**

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

- Perform arithmetic operations in any number system.
- Simplify the Boolean expression using K-Map and Tabulation techniques.
- Use Boolean simplification techniques to design a combinational hardware circuit.
- Design and analysis of a given digital circuit – combinational and sequential.
- Design a circuit using PLD
- Possess the ability to design an efficient digital circuit for simple real time applications

**UNIT -I      BOOLEAN ALGEBRA AND LOGIC GATES      (9)**

Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Logic gates

**UNIT- II      COMBINATIONAL LOGIC      (9)**      Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion – Introduction to Hardware Description Language (HDL)

**UNIT -III      DESIGN WITH MSI DEVICES      (9)**      Decoders and encoders - Multiplexers and demultiplexers - Memory and programmable logic - HDL for combinational circuits

**UNIT- IV      SYNCHRONOUS SEQUENTIAL LOGIC****(9)**

Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters - HDL for sequential logic circuits, Shift registers and counters.

**UNIT -V      ASYNCHRONOUS SEQUENTIAL LOGIC****(9)** Analysis

and design of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards.

**Total Hours: 45****TEXT BOOKS:**

1. Morris Mano.M Digital Design (3<sup>rd</sup> Edition) Pearson Education, New Delhi. 2002
2. Charles H.Roth Fundamentals of Logic Design (4<sup>th</sup> Edition) Jaico Publishing House, New Delhi. 2014

**REFERENCES:**

1. Donald D.Givone Digital Principles and Design(4<sup>th</sup> Edition) Tata McGraw- HillNew ,Delhi 2003
2. Thomas L.Floyd, Digital Fundamentals, Pearson Education,2000.
3. Godse.A.P Digital Logic Design (3<sup>rd</sup> Edition) Tata McGraw-Hill,New Delhi 2009.

**WEBSITES:**

1. [http://www.allaboutcircuits.com/vol\\_2/chpt\\_9/2.html](http://www.allaboutcircuits.com/vol_2/chpt_9/2.html)
2. <http://www.educyclopedia.be/electronics/digital.htm>

**COURSE OBJECTIVES:**

- Understand the concepts of object-oriented, event driven, and concurrent programming paradigms
- Discuss basic concepts of Object-Oriented Programming
- Develop skills in using these paradigms using Java.
- Analyze and compare the efficiency of algorithms
- Possess the ability to design efficient algorithms for solving computing problems
- Explain simple Java programming environment, compile programs and interpret compiler errors.

**COURSE OUTCOMES:**

- Able to use a simple Java programming environment, compile programs and interpret compiler errors.
- Able to understand and use the fundamental data types.
- Able to develop a program from a given design.
- Able to understand and implement the branching and looping statements
- Able to identify the objects and classes and apply in the suitable context.
- Able to develop a program from a given design

**UNIT I Fundamentals of Object-Oriented Programming with JAVA****(9)**

Introduction to Object oriented programming – Benefits and Applications of OOP- structural programming versus object oriented programming - Simple Java Program - Data Types – Operators – Expressions - Decision Making and Loop control Statements - The?: Operator - Arrays-Strings – Getting input in java.

**UNIT II Classes, Objects and Methods****(9)**

Defining a Class-Creating Objects-Accessing Class Members-Constructors-Methods Overloading-Static Members-Nesting of Methods-Final Variables and Methods- Final Classes- Finalize Methods-Visibility Control

**UNIT III Inheritance and Interfaces****(9)**

Motivation -Inheritance: Extending a Class– Types of Inheritance -Overriding Methods- Interfaces in Java (Interface and Implement) -Multiple inheritance – Examples

**UNIT IV Managing Errors and Exception Handling****(9)**

Motivation – Exception handling – Exception hierarchy – Throwing and Catching exceptions - Syntax of Exception Handling Code - Types of Errors -Multiple Catch Statements-Using Finally Statement -User defined Exceptions -Using Exceptions for Debugging.

**UNIT V Input /Output Streams****(9)**

Motivation - I/O Streams - Concept of Streams-Stream Classes-Byte Stream Classes-Character Stream Classes-Using Streams-Other Useful I/O Classes-Using the File Class-Input/Output Exceptions-Creation of Files-Reading/Writing Characters-Reading/Writing Bytes-Handling Primitive Data Types-



**TEXT BOOKS:**

1. Herbert Schildt "Java: The Complete Reference", 9th Edition, Mcgraw-Hill, 2014.
2. D.T. Editorial Services , "Java 8 Programming: Black Book", Dreamtech Press, 2015.
3. Yashawant Kanetkar, "Let Us Java", 1<sup>st</sup> Edition, PBP Publications, 2012 .
4. C. Thomas Wu, "An Introduction to Object-Oriented programming with Java", 5<sup>th</sup> Edition Tata McGraw-Hill Publishing company Ltd 2010.

**REFERENCES:**

1. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", 8th Edition, Sun Microsystems Press, 2011
2. Timothy Budd "Understanding Object-oriented programming with Java" Pearson Education, 2nd edition, 2006
3. Herbert Schildt, "Java The Complete Reference", Oracle Press, 8<sup>th</sup> edition, 2011

**WEBSITES:**

1. [http://java](http://java.sun.com)
2. [va.sun.com](http://java.sun.com).

**COURSE OBJECTIVES:**

- To have an understanding of foundations of design of assemblers, loaders, linkers, and macro processors
- To understand the relationship between system software and machine architecture.
- To know the design and implementation of assemblers
- To know the design and implementation of linkers and loaders.
- To have an understanding of macro processors.
- To discuss the functions of Operating Systems and usage of system software tools

**COURSE OUTCOMES:**

- To have an understanding of foundations of design of assemblers, loaders, linkers, and macro processors
- To understand the relationship between system software and machine architecture.
- To know the design and implementation of assemblers
- To know the design and implementation of linkers and loaders.
- To have an understanding of macro processors.
- To understand the functions of Operating Systems and usage of system software tools

**UNIT- I Introduction****(9)**

System software and machine architecture – The Simplified Instructional Computer (SIC) - XE - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

**UNIT- II Assemblers****(9)**

Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers - Implementation example - MASM assembler.

**UNIT- III Loaders and Linkers****(9)**

Basic loader functions - Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker.

**UNIT-IV Macro Processors****(9)**

Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example - MASM Macro Processor – ANSI C Macro language.

**UNIT- V      Operating system and system software tools                         (9)**

Basic Operating System Functions-Machine Dependent Operating System Features:Interrupt Processing-Process Scheduling-I/O Supervision- Machine Independent Operating System Features: File Processing, Operating System Design Options: Multiprocessor Operating Systems-Distributed Operating Systems-Object Oriented Operating Systems. Text editors - Editor Structure. - Interactive debugging systems

**Total Hours: 45**

**TEXT BOOKS:**

1. Leland L. Beck, “System Software – An Introduction to Systems Programming “, Pearson Education Asia.3<sup>rd</sup> edition,2011

## REFERENCES:

1. Dhamdhare.D.M, “Systems Programming and Operating Systems “, Tata McGraw-Hill, New Delhi, 2009
2. John J. Donovan, “Systems Programming “, Tata McGraw-Hill , New Delhi, 2002

## WEBSITES:

1. [http://www.omninerd.com/articles/PC\\_Bootstrap\\_Loader\\_Programming\\_Tutorial\\_in\\_ASM](http://www.omninerd.com/articles/PC_Bootstrap_Loader_Programming_Tutorial_in_ASM)
2. [www.tenouk.com/ModuleW.html](http://www.tenouk.com/ModuleW.html)

**COURSE OBJECTIVES:**

- Understand and use basic programming syntax using JavaScript
- Discuss the concepts in Javascript language
- Understand and use JavaScript to enhance HTML documents and webpages
- Understand the Java Scripts Libraries and advanced applications
- Discuss the security aspects related to Javascript
- Understand and use predefined JavaScript objects

**COURSE OUTCOMES:**

- Describe the origins of JavaScript and list its key characteristics.
- Communicate with users using JavaScript.
- Define and call JavaScript functions.
- Control program flow.
- Identify and use the JavaScript language objects.
- Use JavaScript with HTML form controls.

**UNIT I      Programming Fundamentals****(9)**

What is JavaScript? Brief history-Common use-cases-Runtime environments-Overview of language features-Running JavaScript in the browser and at the command line-Debugging JavaScript in the browser- Authoring and debugging code -The roles and relationships between HTML, CSS and Javascript

**UNIT II      The Javascript Language****(9)**

Basic data types, variables, objects, and mathematical operations- Control structures, conditionals, looping, functions- Data and data structures : Objects -Arrays - Dates and other built-in data objects- More data structures :Functions, objects, and data -JSON - Advanced control structures

**UNIT III      Javascript and the behavior of Web pages****(9)**

Making Web pages behave: manipulating the DOM- Working with Browser Events • Script loading, responding to keyboard input or mouse activity, scrolling- Forms and AJAX- Using Javascript Libraries for Advanced Behavior :JQuery and others • Animations, AJAX, form and data handling

**UNIT IV      Javascript Libraries and Advanced Applications****(9)**

Understanding How Libraries Work -Library Architecture and design patterns -Writing a JQuery plugin- Other kinds of libraries-Media players, layout managers -Writing your own library-Javascript and multimedia

**UNIT V      Security****(9)**

Same-origin policy. Cross-site scripting attacks (reflected and persisted). Cookie theft and forgery.Whitelisting and blacklisting.

**Total Hours: 45**

**TEXT BOOKS:**

1. Modern Javascript: Develop and Design by Larry Ullman, Peachpit Press, 2012

**REFERENCES:**

1. Javascript Bible, 7th Edition, Danny Goodman Michael Morrison Paul Novitski Tia Gustaff Rayl, Wiley India Pvt Ltd 2014
2. Web Technologies Black Book: HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Kogent Learning Solutions Inc, Dreamtech Press 2014

**WEBSITES:**

1. <http://proquest.safaribooksonline.com.ezpprod1.hul.harvard.edu/book/programming/javascript/9780132905848>

**COURSE OBJECTIVES:**

- A competence to design, write, compile, test and execute straightforward programs using a high level language such as Java
- Discuss the importance and applications of various packages in java script
- Develop solutions for various simple problems in java programming using applets and threads
- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Discuss programs in java with GUI
- Demonstrate the ability to use simple data structures like arrays in a Java program. □

**COURSE OUTCOMES:**

- Understand the principles of OOP.
- Be able to demonstrate good object-oriented programming skills in Java.
- Understand the capabilities and limitations of Java.
- Be able to describe, recognise, apply and implement selected design patterns in Java.
- Be familiar with common errors in Java and its associated libraries, applets and threads
- Able to develop a program from a given GUI.

**LIST OF EXPERIMENTS**

1. Create Java package with simple stack and queue class
2. Write a Java program to perform Complex number manipulation
3. Write a Java program for Date class similar to java.util package
4. Write a Java program for implementing dynamic polymorphism in java
5. Write a Java program for ADT stack using Java interface
6. Write a Java program for DNA file creation
7. Develop a simple paint like program using applet
8. Develop a scientific calculator using java
9. Developing a template for linked list
10. Develop a multi threaded producer consumer Application
11. Write a Java program for generating prime numbers and Fibonacci series
12. Write a Java program for Multithreaded GUI application

**Total Hours: 45**

**COURSE OBJECTIVES:**

- To learn and understand basic digital design techniques.
- To learn and understand design and construction of combinational and sequential circuits.
- To understand the digital logic and create various systems by using these logics.
- Explain analysis and design digital combinational circuits like decoders, encoders, multiplexers, and de-multiplexers including arithmetic circuits (half adder, full adder, multiplier).
- Explain how to analyze sequential digital circuits like flip-flops, registers, counters.
- Understand the importance and need for verification, testing of digital logic and design for testability

**COURSE OUTCOMES**

- Learn the basics of gates.
- Construct basic combinational circuits and verify their functionalities
- Apply the design procedures to design basic sequential circuits
- Able to analyze and design digital combinational circuits like decoders, encoders, multiplexers, and de-multiplexers including arithmetic circuits (half adder, full adder, multiplier).
- Able to analyze sequential digital circuits like flip-flops, registers, counters.
- Understand the importance and need for verification, testing of digital logic and design for testability.

**LIST OF EXPERIMENTS**

- 1.Verification of Boolean theorems using digital logic gates
- 2.Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.
- 3.Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices
- 4.Design and implementation of parity generator / checker using basic gates and MSI devices
- 5.Design and implementation of magnitude comparator
- 6.Design and implementation of application using multiplexers
- 7.Design and implementation of Shift registers
- 8.Design and implementation of Synchronous and Asynchronous counters
- 9.Coding combinational circuits using Hardware Description Language (HDL software required)
- 10.Coding sequential circuits using HDL (HDL software required)

**Total Hours: 45**

**COURSE OBJECTIVES:**

- Analyze performance of algorithms. Choose the appropriate data structure and algorithm design method for a specified application.
- Determine which algorithm or data structure to use in different scenarios
- Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs
- Demonstrate understanding of various sorting algorithms, including bubble sort, selection sort, heap sort and quick sort.
- Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.
- Program multiple file programs in a manner that allows for reusability of code. □

**COURSE OUTCOMES:**

- Able to understand the importance of structure and abstract data type, and their basic usability indifferent applications through different programming languages.
- Able to analyze and differentiate different algorithms based on their time complexity.
- Able to understand the linked implementation
- Able to understand usesof bothlinear and non-linear data structure.
- Able to understand various data structure such as stacks, queues, trees, graphs, etc.
- Able to solve various computing problems

**LIST OF EXPERIMENTS**

1. Implementation of List using Arrays
2. Implementation of Singly Linked List
3. Implementation of Linked Stack
4. Implementation of Linked Queue
5. Implementation of any two stack applications
6. Implementation of Insertion Sort
7. Implementation of Merge Sort
8. Implementation of Quick Sort
9. Implementation of Insertion operation in Binary Search Tree
10. Implementation of Tree Traversals
11. Implementation of Hashing with any one collision resolution method
12. Implementation of Dijkstra's Shortest Path Algorithm

**Total Hours: 45**



**COURSE OBJECTIVES:**

- Understand the internal storage structures using different file systems
- Discuss indexing techniques which will help in physical DB design. □
- Learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- Know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- Possess the knowledge about the emerging trends in the area of distributed DB- OO concepts
- Discuss DB- Data mining and Data Warehousing and XML.

**COURSE OUTCOMES:**

On successful completion of this module, the student should:

- Have gained knowledge and understanding of what is involved in the design of a database modeling
- Have gained knowledge and understanding of the relational models used for structuring data in database systems.
- Be able to implement a database and report on the data storage and query processing.
- Be able to query a database based on transaction management
- Apply the database knowledge to avoid the concurrency and deadlock problems
- Able to apply the database knowledge in the up coming current trends.

**UNIT-I Introduction and Conceptual Modeling****(9)**

Introduction to File and Database systems- Database system structure –Introduction and concept Modeling-Database user Data Models – Introduction to Network and Hierarchical Models – ER model – Relational Model – Relational Algebra and Calculus.

**UNIT-II Relational Model****(9)**

SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design-Relational Models-Design issues – Functional dependences and Normalization for Relational Databases (up to BCNF).

**UNIT- III Data Storage and Query Processing****(9)**

Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree – Query Processing. Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree – Query Processing.

**UNIT- IV Transaction Management****(9)**

Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of Transaction- Schedule and Recoverability- Serializability and Schedules – Concurrency Control – Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control – Recovery Techniques – Concepts- Immediate Update- Deferred Update - Shadow Paging.

## **UNIT- V      Current Trends**

**(9)**

Object Oriented Databases – Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogenous- Distributed data Storage – XML – Structure of XML- Data- XML Document- Schema- Querying and Transformation.  
– Data Mining and Data Warehousing.

**Total Hours: 45**

### **TEXT BOOKS:**

1. Abraham Silberschatz, Henry F.Korth and S.Sudarshan” Database System Concepts”, McGraw-Hill, 6<sup>th</sup> edition,2011.
2. Raghuramakrishnan and Johannes Gehrke, “Database Management Systems”, 3<sup>rd</sup> Edition, McGraw Hill, 2002
3. Ramesh Elmasri, ShamkantB.Navathe, “Fundamentals of Database Systems”, 5<sup>th</sup> Edition, Pearson Education, 2008

### **REFERENCES:**

1. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom” Database System Implementation” Pearson Education, 2<sup>nd</sup> Edition,2013
2. Peter Rob and Corlos Coronel “Database System, Design Implementation and Management”, Thompson Learning Course Technology, 11<sup>th</sup> Edition,2014.

### **WEBSITES:**

1. <http://www.tutorialized.com/tutorial/DB2-Tutorial/>
2. <http://www.techutorials.info/datadb2.html>
3. <http://www.firstsql.com/tutor.htm>
4. <http://sqlzoo.net/>

**COURSE OBJECTIVES:**

- To discuss the basic structure of a digital computer and basic operational concepts
- To study in detail the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.
- To have a thorough understanding of the basic structure and operation of a digital computer.
- To discuss in detail the operation of the arithmetic unit including the algorithms
- To discuss implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study in detail the different types of control and the concept of pipelining.

**COURSE OUTCOMES:**

The main goal of the course is for students to:

- Be able to understand simple circuits from logic formula.
- Understand the basics of assembly language.
- Understand the main concepts of computer architecture
- Be able to explain how the various parts of a modern computer function and cooperate.
- Be able to exploit the advantages of an advanced computer memory having virtual memory and Cache
- Implement assembly programs that accomplish basic computational and I/O operations

**UNIT- I      Basic structure of computers****(9)**

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.

**UNIT- II      Arithmetic unit****(9)**

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

**UNIT- III Basic processing unit****(9)**

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

**UNIT- IV Memory system and i/o organization****(9)**

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage. Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits-Serial Communication

## **UNIT- V Multiprocessor architecture**

**(9)**

Forms of Parallel Processing: Array Processors-Multiprocessors-Interconnection Networks :Single Bus-Crossbar NetworksMultistage Networks-Hypercube NetworksMesh Networks-Tree Networks Ring Networks-Memory Organization in Multiprocessors- Program Parallelism and Shared Variables-Performance Consideration: Amdahl's Law –Performance Indicators-Intel connection structure, intel connection arbitration

**Total Hours: 45**

### **TEXT BOOKS:**

1. Computer Organization and Architecture Designing for Performance, William Stallings, Pearson Education, New Delhi. 2013
2. Computer System Architecture , M. Morris Mano (3rd Edition), Prentice Hall, 2013

### **REFERENCES:**

1. Computer Organization, Carl Hamacher, Zvonko Vranesic and Safwat Zaky, McGraw-Hill, 2012
2. Computer Organization and Design: The hardware / software interface, David A. Patterson and John L. Hennessy, Morgan Kaufmann, Pune. 2011
3. Computer Architecture and Organization, John P. Hayes, McGraw Hill , New Delhi , 2012

### **WEBSITES:**

1. [www.eastaughts.fsnet.co.uk/cpu/structure-alu.htm](http://www.eastaughts.fsnet.co.uk/cpu/structure-alu.htm)
2. <http://e-articles.info/e/a/title/Types-of-Memory/www.comptechdoc.org/hardware/pc/begin/hwmemory.html>

**COURSE OBJECTIVES:**

- To introduce the h/w architecture, instruction set and programming of 8086 microprocessor.
- To explain various software aspects of 8086
- To introduce the peripheral interfacing of microprocessors.
- To introduce the h/w architecture of ARM processor
- To introduce the h/w architecture, instruction set, programming and interfacing of 8051 microcontroller.
- To discuss assembly language programs and download the machine code that will provide solutions real-world control problems

**COURSE OUTCOMES:**

- Assess and solve basic binary math operations using the microprocessor and explain the microprocessor's and Microcontroller's internal architecture and its operation within the area of manufacturing and performance.
- Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller.
- Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) and Microcontroller to meet specified performance requirements.
- Analyze assembly language programs; select appropriate assembler into machine a cross assembler utility of a microprocessor and microcontroller.
- Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.
- Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems

**UNIT -I      THE 8085 MICROPROCESSOR (9)** Introduction to 8085 – Microprocessor architecture – Instruction set – Programming the 8085 – Code conversion.

**UNIT- II      8086 SOFTWARE ASPECTS (9)**

Intel 8086 microprocessor – Architecture – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines.

**UNIT- III      8086 SYSTEM DESIGN (9)**

8086 signals and timing – MIN/MAX mode of operation – Addressing memory and I/O – Multiprocessor configurations – System design using 8086

## **UNIT- IV     I/O INTERFACING**

**(9)**

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications.

## **UNIT- V     MICROCONTROLLERS**

**(9)**

Architecture of 8051 – Signals – Operational features – Memory and I/O addressing – Interrupts – Instruction set – Applications.

**Total Hours: 45**

### **TEXT BOOKS:**

1. Ramesh S.Gaonkar Microprocessor– Architecture Programming and Applications with the 8085 Penram International publishing private limited. 2008
2. Ray A.K &K.M.Bhurchandi Advanced Microprocessors and peripherals- Architectures Programming and Interfacing TMH 2006

### **REFERENCES:**

1. Douglas V.Hall Microprocessors and Interfacing Programming and Hardware TMH
2. 2003
3. Yu-cheng Liu Glenn A.Gibson Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design, PHI 2008
4. Mohamed Ali Mazidi, Janice Gillispie Mazidi The 8051 microcontroller and embedded systems, Pearson education 2007

### **WEBSITES:**

1. <http://www.8052.com/tut8051><http://www.eastaughs.fsnet.co.uk/cpu/index.htm>
2. <http://www.webphysics.davidson.edu/faculty/dmb/py310/8085.pdf>
3. [http://www.aust.edu/cse/moinul/8086\\_lectures.pdf](http://www.aust.edu/cse/moinul/8086_lectures.pdf)
4. <http://www.cache.com.hk/datasheetC8255ovview.html>

**COURSE OBJECTIVES:**

- Evaluate storage architectures and key data center elements in classic, virtualized and cloud environments
- Explain physical and logical components of a storage infrastructure including storage subsystems, RAID and intelligent storage systems
- Describe storage networking technologies such as FC-SAN, IP-SAN, FCoE, NAS and object- based, and unified storage
- Understand and articulate business continuity solutions – backup and replications, along with archive for managing fixed content.
- Explain key characteristics, services, deployment models, and infrastructure components for a cloud computing
- Discuss how to manage virtual servers and storage between remote locations

**COURSE OUTCOMES:**

- Describe and apply storage technologies
- Identify leading storage technologies that provide cost-effective IT solutions for medium to large scale businesses and data centers
- Describe important storage technologies’ features such as availability, replication, scalability and performance
- Work in project teams to install, administer and upgrade popular storage solutions
- Identify and install current storage virtualization technologies
- Manage virtual servers and storage between remote locations

## UNIT I Storage System (9)

Introduction to information storage, Virtualization and cloud computing, Key data center elements, Compute, application, and storage virtualization, Disk drive & flash drive components and performance, RAID, Intelligent storage system and storage provisioning (including virtual provisioning)

**UNIT II      Storage Networking Technologies and Virtualization      (9)**

Fibre Channel SAN components, FC protocol and operations, Block level storage virtualization, iSCSI and FCIP as an IP-SAN solutions, Converged networking option – FcoE, Network Attached Storage (NAS) – components, protocol and operations, File level storage virtualization, Object based storage and unified storage platform.

## UNIT III Backup, Archive and Replication (9)

Business continuity terminologies, planning and solutions, Clustering and multipathing to avoid single points of failure, Backup and recovery – methods, targets and topologies, data deduplication and backup in virtualized environment, fixed content and data archive, Local replication in classic and virtual environments, Remote replication in classic and virtual environments, Three-site remote replication and continuous data protection.

**UNIT IV      Cloud Computing****(9)**

Characteristics and benefits, Services and deployment models, Cloud infrastructure components, Cloud migration considerations.

**UNIT V      Securing and Managing****(9)**

Storage Infrastructure Security threats, and countermeasures in various domains, Security solutions for FC-SAN, IP-SAN and NAS environments, Security in virtualized and cloud environments, Monitoring and managing various information infrastructure components in classic and virtual environments, Information lifecycle Management (ILM) and storage tiering.

**Total Hours:45****TEXT BOOKS:**

1. Information Storage and Management: Storing, Managing and Protecting Digital Information in classic, Virtualized and Cloud Environments, 2nd Edition, EMC Educations Services, Wiley, May 2012.

**REFERENCES:**

1. Ulf Troppens, Rainer Erkens, Wolfgang Mueller-Friedt, Rainer Wolafka, Nils Haustein , "Storage Networks Explained: Basics and Application of Fibre Channel SAN, NAS, iSCSI, InfiniBand and FCoE, 2nd Edition, Wiley, July 2009
2. Information Storage and Management: Storing, Managing, and Protecting Digital Information, EMC Education Services, Wiley, January 2010



**COURSE OBJECTIVES:**

- To analyze the worst-case, average case and the best case
- To write fundamental algorithmic strategies
- To demonstrate a various Graph and Tree Algorithms
- To explain tractable and intractable problems
- To explain advanced topics in algorithm
- To explain algorithms in common engineering design situation

**COURSE OUTCOMES:**

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

- Analyze worst-case, average case and the best case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
- Analyze fundamental algorithmic strategies
- Analyze various Graph and Tree Algorithms
- Understand Tractable and Intractable Problems
- Understand Advanced Topics like Approximation algorithms, Randomized algorithms, Class of problems beyond NP-PSPACE
- To write the effective algorithms to solve engineering problems

**UNIT I INTRODUCTION****(9)**

Fundamentals of Algorithmic Problem Solving – Performance Analysis- Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms, Ex: Fibonacci Series- Probabilistic analysis- Amortized Analysis.

**UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER****(9)**

Brute Force – Closest-Pair and Convex-Hull Problems- Bubble Sort- Sequential Search – Divide and conquer methodology – Merge sort – Quick sort- Strassen's Matrix Multiplication.

**UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE****(9)**

Dynamic Programming – Warshall's and Floyd's algorithm – Optimal Binary Search Trees – Greedy Techniques- Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm- Huffman Trees.

**UNIT IV BACK TRACKING AND BRANCH AND BOUND****(9)**

Backtracking – n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem- graph colouring- Branch and Bound – Assignment problem – Knapsack Problem – Traveling Salesman Problem

Basic Concepts- Non Deterministic algorithms-NP Hard and NP Complete Classes-Cool's Theorem

**Total Hours:45**

**TEXT BOOK:**

1. AnanyLevitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.

**REFERENCES:**

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
3. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009.  
Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.
4. <http://nptel.ac.in/>

**COURSE OBJECTIVES:**

- To have an introductory knowledge of automata, formal language theory and computability.
- To have an understanding of finite state and pushdown automata.
- To have a knowledge of regular languages and context free languages.
- To know the relation between regular language, context free language and corresponding recognizers.
- To study the Turing machine and classes of problems
- To understand the concepts of Formal Language & Automata Theory in detail

**COURSE OUTCOMES:**

Upon completion of the course, the students should be able to :

- Design a finite automaton for a specific language.
- Design a Turing machine.
- Select appropriate grammar for the implementation of compiler phases
- Design a lexical analyzer
- Design a simple parser
- Design and implement techniques used for optimization by a compiler.

**UNIT- I Introduction To Automata (9)**

Basics of String and Alphabets - Finite Automata (FA) – Deterministic Finite Automata (DFA)– Non-deterministic Finite Automata (NFA) – Conversion of NFA to DFA- Finite Automata with Epsilon transition-Equivalence and Minimization of Automata

**UNIT- II Regular Expressions And Languages (9)**

Regular Expression – FA and Regular Expressions – Proving languages not to be regular –Pumping lemma for regular sets - Closure properties of regular languages- Decision Properties of Regular Languages

**UNIT- III Context-Free Grammar And Languages (9)**

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata- Pumping Lemma for CFL - Closure Properties of CFL- Context Sensitive Grammar (CSG) & Languages

**UNIT IV Properties of Context Free Grammar (9)**

Normal forms for Context Free Grammar- Chomsky Normal Form- The Pumping lemma for Context free Languages- Closure properties of Context Free Languages-Inverse Homomorphism-Decision Properties of CFL

**UNIT- V Turing Machine (9)**

Turing Machines – Introduction- Definition – Turing machine construction- Storage in Finite control- Multiple tracks- Subroutines-Checking of Symbols – Two way infinite tape-Undecidability .

**Total Hours: 45**

**TEXT BOOKS:**

1. Hopcroft J.E, R.Motwani and J.D.Ullman, Introduction to Automata Theory, Languages and Computations, Pearson Education, 2011.

**REFERENCES:**

1. Lewis H.R and C.H.Papadimitriou, Elements of The theory of Computation, Pearson Education, PHI, 2009.
2. Martin J, Introduction to Languages and the Theory of Computation, TMH, 2010
3. Micheal Sipser, Introduction of the Theory and Computation, Edition, Thomson Brokecole, 2012.
4. An Introduction to Formal Languages and Automata, 5th Edition, Peter Linz, 2011

**WEBSITES:**

1. <http://www.regular-expressions.info/tutorial.html>
2. <http://www.cs.duke.edu/csed/jflap/tutorial/fa/nfa2dfa/index.html>
3. <http://web.cecs.pdx.edu/~harry/compilers/slides/LexicalPart3.pdf>

## COURSE OBJECTIVES

- Understand the concepts of object-oriented, event driven, and concurrent programming paradigms
- Develop skills in using these paradigms using Java.
- To understand and implement the concepts of interfaces and packages
- To implement a multithreaded program
- Explain how to manage exceptions for real time applications
- Explain how to design an event driven program using applet

## COURSE OUTCOMES:

- After completion of this course, the students would be able to
- Understand programming language concepts, particularly Java and object-oriented concepts.
- Write, debug, and document well-structured Java applications.
- Implement Java classes from specifications. Effectively create and use objects from predefined class libraries.
- Understand the behavior of primitive data types, object references, and arrays.
- Apply decision and iteration control structures to implement algorithms.

### Theory:

Creating Threads-Extending the Thread Class- Thread states -Stopping and Blocking a Thread-Life Cycle of a Thread- Thread Exceptions- Thread Priority- Synchronization

The Object class – Reflection – interfaces – object cloning – inner classes – generic classes – generic methods – inheritance and generics – reflection and generics

Preparing to Write Applets-Building Applet Code-Applet Life Cycle-Creating an Executable Applet-Designing a Web Page-Applet Tag-Adding Applet to HTML File-Running the Applet-Getting Input from the User-Event Handling-The Graphics Class

Sockets – secure sockets – custom sockets –Java Messaging services

JUnit – Overview - Environment Setup - Test Framework - JUnit Basic Usage - API's of JUnit - Writing Test – Executing Tests - Suite Test - Ignore Test - Time Test - Exceptions Test - Parameterized Test - Plug with Eclipse – Extensions

### List of Experiments

- Write a java program to implement the concept of threading by extending Thread Class
- Write a java program to implement the concept of thread priority.
- Write a java program to implement the methods of thread States.
- Write a java program to implement the concept of thread Synchronization.
- Write a java program to implement the concept of Object Cloning.
- Write a java program to implement the concept of Reflection.
- Write a java program to implement the concept of inner Classes.
- Write a java program to implement the concept of Generic Classes and Generic Methods.

- Write a Java Program to demonstrate Keyboard event in Applet
- Write a Java Program to demonstrate Mouse events in Applet.
- Write a Java Program to draw different shapes using Graphics Class in Applet
- Write a Java program to create Client-Server network for Chatting between Client and Server.
- Write a java program and test that program using JUnit Testing in Eclipse

**TEXT BOOKS:**

1. Herbert Schildt “Java: The Complete Reference”, 9th Edition, McGraw-Hill, 2014.
2. Harold Elliott Rusty “Java Network Programming” 4 Edition, 2014.
3. Yashawant Kanetkar, “Let Us Java”, 1st Edition, PBP Publications, 2012

**REFERENCES:**

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, 8th Edition, Sun Microsystems Press, 2011
2. Timothy Budd “Understanding Object-oriented programming with Java” Pearson Education, 2nd edition, 2006
3. C. Thomas Wu, “An Introduction to Object-Oriented programming with Java”, 5th Edition Tata McGraw-Hill Publishing company Ltd 2010
4. E. Balagurusamy, “Programming with Java”, 4th Edition, Tata McGraw Hill, 2010

**WEBSITES:**

1. <http://java.sun.com>.

**Total Hours: 45**

**COURSE OBJECTIVES:**

- Master the basic concepts and appreciate the applications of database systems.
- Master the basics of SQL and construct queries using SQL.
- Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.
- Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.
- Master sound design principles for logical design of databases, including the E-R method and normalization approach.
- Master the basics of query evaluation techniques and query optimization.

**COURSE OUTCOMES:**

After completion of this course, the students would be able to

- Understand, appreciate and effectively explain the underlying concepts of database technologies
- Design and implement a database schema for a given problem-domain
- Normalize a database
- Populate and query a database using SQL DML/DDDL commands.
- Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.
- Design and build a GUI application.

**LIST OF EXPERIMENTS**

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. High-level language extension with Cursors.
4. High level language extension with Triggers
5. Procedures and Functions.
6. Embedded SQL.
7. Database design using E-R model and Normalization.
8. Design and implementation of Payroll Processing System.
9. Design and implementation of Banking System.
10. Design and implementation of Library Information System.
11. Database connectivity using JDBC
12. Database connectivity using ODBC

**Total Hours: 45**

**COURSE OBJECTIVES:**

The student should be made to:

- Introduce ALP concepts and features
- Explain to write a program for 8085 Microprocessor
- Write ALP for arithmetic and logical operations in 8086 and 8051
- Differentiate Serial and Parallel Interface
- Interface different I/Os with Microprocessors
- Discuss the concepts related to I/O and memory interfacing

**COURSE OUTCOMES:**

- Ability to write a program for 8085 Microprocessor
- Ability to write a program for 8086 Microprocessor
- Ability to determine the program for Interfacing
- Ability to write a program for 8051 Microcontroller
- Design and implement 8051 microcontroller-based systems
- To Understand the concepts related to I/O and memory interfacing

**List of Experiments**

1. Use of 8-bit and 32-bit Microcontrollers (such as 8051 Microcontroller, ARM2148 / ARM2378, LPC 2141/42/44/46/48), Microcontroller and C –compiler (Keil), Arduino IDE :
  - I) Interface Input – Output and other units such as: Relays, LEDs, LCDs, Switches, keypads, Stepper Motors, Sensors, ADCs, Timers.
  - II) Demonstrate Communications: RS232, IIC and CAN protocols,
  - III) Develop Control Applications such as: Temperature controller, Elevator controller, Traffic Controller.
2. Development and Porting of Real time applications on to Target machines such as Intel or other Computers using any RTOS.
  - I) Understanding Real Time Concepts using any RTOS through demonstration of:
    - a) Timing
    - b) Multi-tasking
    - c) Semaphores
    - d) Message Queues
    - e) Round-Robin Task Scheduling
    - f) Preemptive Priority based Task Scheduling
    - g) Priority Inversion
    - h) Signals



- II) Applications development using any RTOS:
- a) Any RTOS Booting.
  - b) Application Development under any RTOS.

**TEXT BOOKS:**

1. Wayne Wolf: Computers as Components, Principles of Embedded Computing Systems Design, 2nd Edition, Elsevier, 2008.
2. Shibu K V: Introduction to Embedded Systems, Tata McGraw Hill, 2009 (Chapters 10, 13)

**REFERENCES:**

1. James K. Peckol: Embedded Systems, A contemporary Design Tool, Wiley India, 2008
2. Tammy Neorgaard: Embedded Systems Architecture, Elsevier, 2005.

**COURSE OBJECTIVES:**

- To have a thorough knowledge of processes, scheduling concepts, memory management, I/O and file systems in an operating system
- To have an overview of different types of operating systems
- To know the components of an operating system.
- To have a thorough knowledge of process management
- To have a thorough knowledge of storage management
- To know the concepts of I/O and file systems.

**COURSE OUTCOMES:**

- Understand device and I/O management functions in operating systems as part of a uniform device abstraction.
- Have an understanding of disk organization and file system structure.
- Be able to give the rationale for virtual memory abstractions in operating systems.
- Understand the main principles and techniques used to implement processes and threads as well as the different algorithms for process scheduling.
- Understand the main mechanisms used for inter-process communication.
- Understand the main problems related to concurrency and the different synchronization mechanisms available.

**UNIT- I Introduction****(9)**

Introduction – OS Concepts- OS Structures- kernel, shell-Evolution of OS- Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.

**UNIT –II Scheduling (9)**

Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors.

**UNIT- III Deadlocks****(9)**

System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping– Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.

**UNIT- IV Virtual Memory****(9)**

Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File Sharing – Protection

## **UNIT- V      File Systems(9)**

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management– Swap-Space Management. Case Study: The Linux System, Windows 2000 – Introduction -UNIX

**Total Hours: 45**

### **TEXT BOOKS:**

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne“ Operating Systems Concepts” John Wiley & Sons (ASIA) Pvt. Ltd.2011
2. Andrew S. Tanenbaum, Albert S Woodhull, “The MINIX Book- Operating Systems Design and Implementation,” 3<sup>rd</sup> Edition, Pearson Education Pvt Ltd., 2006.

### **REFERENCES:**

1. Harvey M. Deitel, “Operating Systems” Pearson Education Pvt. Ltd, 2009.
2. Andrew S. Tanenbaum.” Modern Operating Systems”, Prentice Hall of India Pvt. Ltd, NewDelhi, 4<sup>th</sup> edition, 2014.
3. William Stallings, “Operating System”, Prentice Hall of India, 8<sup>th</sup> edition, 2014.

### **WEBSITES:**

1. <http://courses.cs.vt.edu/~csonline/OS/Lessons/index.html>
2. [www.ee.surrey.ac.uk/Teaching/Unix/](http://www.ee.surrey.ac.uk/Teaching/Unix/)

**COURSE OBJECTIVES:**

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms
- To introduce the concepts, terminologies and technologies used in modern days data communication and computer networking.
- To understand the concepts of data communications.

**COURSE OUTCOMES:**

- To understand the division of network functionalities into layers
- To understand the concepts of data communications
- To understand the working of router
- Able to identify the ports used for transferring and receiving data
- Able to identify the flow control mechanism to be adopted in transport layer
- Able to understand the functions of application layer

**UNIT- I Fundamentals & Link layer (9)**

Building a network - ISO / OSI model - Requirements - Layering and protocols - Internet Architecture - Network software - Performance ; Link layer Services - Framing - Error Detection - Flow control

**UNIT –II Media access & Internetworking (9)**

Media access control - Ethernet (802.3) - Wireless LANs - 802.11 - Bluetooth - Switching and bridging - Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP)

**UNIT –III Routing (9)**

Routing (RIP, OSPF, metrics) - Switch basics - Global Internet (Areas, BGP, IPv6), Multicast - addresses - multicast routing (DVMRP, PIM)

**UNIT- IV Transport layer (9)**

Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission - TCP Congestion control - Congestion avoidance (DECbit, RED) - QoS - Application requirements

**UNIT –V Application layer (9)**

Traditional applications - Electronic Mail (SMTP, POP3, IMAP, MIME) - HTTP - Web Services - DNS – SNMP

**Total Hours: 45**

**TEXT BOOKS:**

1. Behrouz A. Forouzan, “Data communication and Networking”, Fourth Edition, Tata McGraw – Hill, 2011.
2. Andrew S. Tanenbaum, “Computer Networks”, Fifth Edition, 2011
3. William Stallings, “Data and Computer Communication”, Tenth Edition, Pearson Education, 2013

**REFERENCES:**

1. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers, 2011.
2. James F. Kurose, Keith W. Ross, "Computer Networking - A Top-Down Approach Featuring the Internet", Fifth Edition, Pearson Education, 2009.
3. Nader. F. Mir, "Computer and Communication Networks", Pearson Prentice Hall Publishers, 2010.
4. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", McGraw Hill Publisher, 2011.

**WEBSITES:**

1. <http://www.freeprogrammingresources.com/tcp.html>
2. <http://www.mcmcse.com/cisco/guides/osi.shtml>
3. [http://compnetworking.about.com/od/vpn/a/vpn\\_tunneling.htm](http://compnetworking.about.com/od/vpn/a/vpn_tunneling.htm)

**COURSE OBJECTIVES:**

- To introduce the methodologies involved in the development and maintenance of software over its entire life cycle.
- To be aware of Different life cycle models and requirement dictation process
- To explain the various effective software engineering processes
- To explain design, cost and principles in a software engineering
- To describe different projects of software testing
- Discuss the process to back track effectively to improve the current functionalities using appropriate software measures

**COURSE OUTCOMES:**

- Plan and deliver an effective software engineering process, based on knowledge of widely used development lifecycle models.
- Employ group working skills including general organization, planning and time management and inter-group negotiation.
- Translate a requirements specification into an implementable design, following a structured and organised process.
- Formulate a testing strategy for a software system, employing techniques such as unit testing, test driven development and functional testing.
- Evaluate the quality of the requirements, analysis and design work done during the module.
- Able to back track effectively to improve the current functionalities using appropriate software measures

**UNIT –I      Software Process****(9)**

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) - system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

**UNIT- II      Software Requirements****(9)**

Functional and non-functional - user – system –requirement engineering process – feasibility studies – requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping -S/W document. Analysis and modelling – data, functional and behavioural models – structured analysis and data dictionary.

**UNIT- III Design Concepts and Principles****(9)**

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems – Real time software design – system design – real time executives – data acquisition system – monitoring and control system.

**UNIT- IV    Testing****(9)**

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues - unit testing – integration testing – validation testing – system testing and debugging.

**UNIT- V      Software Project Management****(9)**

Measures and measurements – S/W complexity and science measure – size measure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method. - Defining Task Network – Scheduling – Earned Value Analysis – Error Tracking - Software changes- program evolution dynamics- software maintenance – Risk management -Architectural evolution.

**Total Hours: 45****TEXT BOOKS:**

1. Roger S.Pressmen, “Software Engineering : A Practitioner’s Approach”, McGraw-Hill International Edition, 4<sup>th</sup> edition, 2014
2. Ian Sommerville, “Software engineering”, Pearson education Asia, 9<sup>th</sup> edition, 2011

**REFERENCES:**

1. Fundamentals of software engineering, Rajib Mall Phi learning pvt. Ltd, 4<sup>th</sup> edition, 2014
2. PankajJalote,” An Integrated Approach to Software Engineering”, Springer Verlag, 3<sup>rd</sup> edition, 2010
3. James F Peters and WitoldPedryez,” Software Engineering – An Engineering Approach”, John Wiley and Sons, New Delhi, 2007

**WEBSITES:**

1. [http://www.testingbrain.com/WHITEBOX/WHITE\\_BOX\\_Testing.html](http://www.testingbrain.com/WHITEBOX/WHITE_BOX_Testing.html)
2. <http://www.cs.drexel.edu/~spiros/teaching/CS576/slides/control-testing.pdf>

**17BECS511**

**Computer Networks Lab**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**COURSE OBJECTIVES:**

- Understand fundamental underlying principles of computer networking
- Understand details and functionality of layered network architecture
- Apply mathematical foundations to solve computational problems in computer networking
- Utilizing Network tools and simulator
- Explain computer networking concepts and vocabulary
- Explain the concept of protocols

**COURSE OUTCOMES:**

- Understand fundamental underlying principles of computer networking
- Understand details and functionality of layered network architecture
- Apply mathematical foundations to solve computational problems in computer networking
- Understands computer networking concepts and vocabulary
- Understands the concept of protocols
- Utilizing Network tools and simulator

**LIST OF EXPERIMENTS**

1. Implementation of Sliding Window Protocol.
2. Study of Socket Programming and Client - Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Create a socket for HTTP for web page upload and download.
6. Write a program to implement RPC (Remote Procedure Call)
7. Implementation of Subnetting .
8. Applications using TCP Sockets like Echo client and echo server
9. Applications using TCP and UDP Sockets like File Transfer
10. Study of Network simulator (NS3), Wireshark

**Total Hours: 45**



**COURSE OBJECTIVES:**

- Grasp a fundamental understanding of computer and operating systems
- Explain various Identify the services provided by operating system
- Learn basic shell programming
- Understand memory management
- Understand process concurrency and synchronization
- Learn the scheduling policies of operating systems

**COURSE OUTCOMES:**

- Identify the services provided by operating system
- Able to write programs on Shell Script
- Understand the internal structure of an operating system and be able to write programs
- Understand and solve problems involving key concepts and theories in operating systems
- Able to implement scheduling algorithms
- Able to understand the memory management concepts

**LIST OF EXPERIMENTS**

(Implement the following on LINUX platform. Use C for high level language implementation)

1. Shell programming
  - command syntax
  - write simple functions
  - basic tests
2. Shell programming
  - loops
  - patterns
  - expansions
  - substitutions
3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
5. Write C programs to simulate UNIX commands like ls, grep, etc.
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
7. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
8. Implement the Producer – Consumer problem using semaphores.
9. Implement some memory management schemes – I
10. Implement some memory management schemes – II
11. Case study: “awk” Scripting Language

**Total Hours: 45**

**COURSE OBJECTIVE:**

- Practicing the different types of case tools such as Rational Rose / other Open Source to be used for all the phases of Software development life cycle.
- Learn the basics of OO analysis and design skills.
- Be exposed to the UML design diagrams.
- Learn to map design to code.
- Be familiar with the various testing techniques
- Discuss the definition, formulas and analysis of a problem

**COURSE OUTCOMES:**

- The students understand the process to be followed in the software development life Cycle
- find practical solutions to the problems
- solve specific problems alone or in teams
- manage a project from beginning to end
- work independently as well as in teams
- define, formulate and analyze a problem

**LIST OF EXPERIMENTS**

1. Implementation of Student Marks Analyzing System
2. Implementation of Quiz System
3. Implementation of Online Ticket Reservation System
4. Implementation of Payroll System
5. Implementation of Course Registration System
6. Implementation of Expert Systems
7. Implementation of ATM Systems
8. Implementation of Stock Maintenance

**Total Hours: 45**

**COURSE OBJECTIVES:**

- At the end of the course the student will be able to design and implement a simple compiler.
- To understand, design and implement a lexical analyzer.
- Explain how to build lexical analyzers and use them in the construction of parsers;
- To understand, design and implement a parser.
- To understand various grammars of a programming language
- To understand, design code generation schemes

**COURSE OUTCOMES:**

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

- build lexical analyzers and use them in the construction of parsers;
- express the grammar of a programming language;
- build syntax analyzers and use them in the construction of parsers;
- perform the operations of semantic analysis;
- discuss the merits of different optimization schemes.
- Able to design and Implement a simple compiler

**UNIT- I Introduction to compiling (9)**

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens.

**UNIT- II Syntax Analysis (9)**

Role of the parser –Writing Grammars –Context-Free Grammars – Top Down parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.

**UNIT –IIIIntermediate code generation (9)**

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

**UNIT- IVCode generation (9)**

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

**UNIT- VCode optimization and run time environments (9)**

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

**Total Hours: 45**

**TEXT BOOKS:**

1. Compilers Principles, Techniques and Tools, Alfred Aho, Ravi Sethi, Jeffrey D Ullman, Pearson Education Asia, 2<sup>nd</sup> edition, 2013
2. Compiler Design in C, Allen I. Holub, Prentice Hall of India, 2006.

**REFERENCES:**

1. Engineering a Compiler, Keith Cooper and Linda Torczon, 2nd Edition, 2011.
2. Introduction to Compiler Techniques, Bennet.J.P, Tata McGraw-Hill, 2007
3. Lex&Yacc , John R. Levine, Tony Mason, Doug Brown, 2nd edition (October 1992) O'Reilly & Associates.
4. Compiler Construction: Principles and Practice, Kenneth C. Loudon, Thompson Learning. 2006

**WEBSITES:**

1. <http://www.tenouk.com/ModuleW.html>
2. <http://www.mactech.com/articles/mactech/Vol.06/06.04/LexicalAnalysis/index.html>

**COURSE OBJECTIVES:**

- To understand the basics of Network Security and its model.
- To learn the legal, ethical and professional issues in Network Security
- To understand the need of risk management and risk control.
- To study the critical need for ensuring Network Security in Organizations.
- To learn the security policy, standards and security analyzing tools.
- Understand the CIA triad of Confidentiality, Integrity and Availability

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Analyze the appropriate techniques to tackle and solve problems in the discipline of information security management.
- Gain the knowledge of security and its management for any modern organization.
- Develop an understanding of security policies to implement, such policies in the form of message exchanges.
- Develop security management system should be planned, documented, implemented and improved, according to the security standard on information security management.
- Use and Examine the threats by security analysis tools
- Understand the CIA triad of Confidentiality, Integrity and Availability

**UNIT I Conventional and Modern Encryption****(9)**

Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher Principles- DES – Strength of DES - Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC5 - Differential and linear crypto analysis – Placement of encryption function – traffic confidentiality

**UNIT II Public Key Encryption****(9)**

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm – Fermat's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm – Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography

**UNIT III Authentication****(9)**

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – MD5 – SHA - HMAC – Digital signature and authentication protocols – DSS

**UNIT IV Security Practice****(9)**

Authentication applications – Kerberos – X.509 Authentication services - E-mail security – IP security - Web security

## **UNIT V      System Security**

**(9)**

Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

**Total Hours: 45**

### **TEXT BOOKS:**

1. William Stallings, “Cryptography & Network Security”, Pearson Education, 4th Edition 2010.

### **REFERENCES:**

1. Charlie Kaufman, Radia Perlman, Mike Speciner, “ Network Security, Private communication in public world” PHI 2nd edition 2002
2. Bruce Schneier, Neils Ferguson, “Practical Cryptography”, Wiley Dreamtech India Pvt Ltd, 2003
3. Douglas R Simson “Cryptography – Theory and practice”, CRC Press 1995 India Pvt. Ltd., 2006

**COURSE OBJECTIVES:**

- Understand the advanced concepts of wireless mobile networks
- Apply transactions for complex model
- Explore the modern design structures of pervasive computing
- Analyze various advanced mobile network models
- Discuss the pervasive computing application device
- Discuss the process to propose solutions with comparisons for problems related to pervasive computing system through investigation.

**COURSE OUTCOMES:**

- Outline the basic problems, performance requirements of pervasive computing applications
- Understand the trends of pervasive computing and its impacts on future computing applications and society.
- Analyze and compare the performance of different data dissemination techniques
- Understand the algorithms for mobile real-time applications
- Analyze the performance of different sensor data management and routing algorithms for sensor networks.
- Develop an attitude to propose solutions with comparisons for problems related to pervasive computing system through investigation.

**UNIT I Introduction to Mobile Computing (9)**

Mobility of bits and bytes – Wireless the beginning – Mobile computing- Dialogue control- Networks– Middleware and gateways- Application and services- Developing mobile computing applications-Security- Standards- Players in wireless space- Architecture for mobile computing- Three tier architecture- Design considerations-Mobile computing through internet-Making existing applications mobile enabled-Developing IVR application.

**UNIT II Mobile Technologies (9)**

Emerging technologies: Bluetooth-Radio frequency identification- Wireless broadband-Mobile IP-Internet protocol version 6-Java card- GSM- Short message services- General packet radio services: Packet data network Architecture-Operations-Data services-Application for GPRS-Limitations of GPRS-Wireless application protocol CDMA and 3G.

**UNIT III Mobile Networking Wireless (9)**

LAN advantage-Standards-Architecture-Mobility-Deploying-Mobile Ad Hoc networks and sensor networks-Security- Wi Fi verses 3G-Internet networks and interworking: Fundamentals of call processing – Intelligence in the networks-SS #7 signaling-IN conceptual model-Soft switch-Programmable networks-Client programming.

**UNIT IV Introduction to Pervasive Computing (9)**

Introduction to pervasive computing: Scenarios–Roaming environment-Pervasive computing infrastructure Personalized services – Pervasive computing market- m-business- Applications examples-Hardware - Human - Machine interfaces biometrics and Operating systems-Java for

pervasive devices.

## **UNIT V      Pervasive Computing Application Device   (9)**

Connectivity – Protocols, security and device management - Pervasive web application architecture

– Transcoding –Client authentication via internet- WAP and beyond - Voice technology: Speech application–Personal digital assistants: Device- Operating systems-Characteristics-Software components-Standards-Mobile applications.

**Total Hours - 45**

### **TEXT BOOKS:**

1. Asoke K Talukder and Poopa R Yavagal, Mobile Computing,Tata McGraw-Hill,2<sup>nd</sup> edition,2010.
2. JochenBuekhardt, Horst Henn, Stefan Hepper, Klaus Rintdorff and Thomas Schack, Pervasive Computing:Technology and architecture of mobile internet applications,Pearson Education,2009.

### **REFERENCES:**

1. Reza B Fat and Roy T Fielding, Mobile Computing Principles, Cambridge University Press, 2010.
2. HansmannUwe, MerkLothar and Nicklous Mart, Pervasive Computing: The Mobile World, Springer Professional, 2011.
3. Chimay J, Anumba and Xiangyu Wang, Mobile and Pervasive Computing, Springer Professional, 2012.



**COURSE OBJECTIVES:**

- Artificial Intelligence aims at developing computer applications, which encompasses
- perception, reasoning and learning and to provide an in-depth understanding of major techniques used to simulate intelligence.
- To provide a strong foundation of fundamental concepts in Artificial Intelligence
- To provide a basic exposition to the goals and methods of Artificial Intelligence
- To enable the student to apply these techniques in applications which involve perception, reasoning and learning.
- To discuss the techniques based on probability theory and possibility theory

**COURSE OUTCOMES:**

- Understand the history, development and various applications of artificial intelligence
- Familiarize with propositional and predicate logic and their roles in logic programming;
- Understand the programming language Prolog and write programs in declarative programming style;
- Learn the knowledge representation and reasoning techniques in rule-based systems, case based systems, and model-based systems;
- Appreciate how uncertainty is being tackled in the knowledge representation and reasoning process, in particular,
- Interpreted the techniques based on probability theory and possibility theory (fuzzy logic)

**UNIT I Introduction and Problem Solving (9)**

Introduction – Foundations of AI – History of AI – Intelligent agent – Types of agents - Structure – Problem solving agents – Uninformed search strategies – Breadth first search – Uniform cost search – Depth first search – Depth limited search – Bidirectional search – Searching with partial Information.

**UNIT II Informed Search and Game Playing (9)**

Informed search – Strategies – A\* Heuristic function – Hill Climbing – Simulated Annealing – Constraint Specification problem – Local Search in continuous space – Genetic algorithm – Optimal decisions in games - Pruning- Imperfect decisions – Alpha-Beta pruning – Games that include an element of chance.

**UNIT III Knowledge and Reasoning (9)**

Knowledge based agent – The Wumpus world environment – Propositional logic – Inference rules – First-order logic – Syntax and semantics – Situation calculus – Building a knowledge base – Electronic circuit domain – Ontology – Forward and backward chaining – Resolution – Truth maintenance system.

#### **UNIT IV     Acting Logically**

**(9)**

Planning – Representation of planning – Partial order planning –Planning and acting in real world – Acting under uncertainty – Bayes's rules – Semantics of Belief networks – Inference in Belief networks – Making simple decisions – Making complex decisions.

#### **UNIT V     Learning and Communication**

**(9)**

Learning from observation – Learning decision trees –Ensemble learning – Learning general logical descriptions – Computational learning theory – Neural networks – Applications – Reinforcement learning – Passive reinforcement – Active reinforcement – Communication as action – Types of communicating agents – Parsing – DCG – Semantic interpretation.

**Total hours:45**

#### **TEXT BOOKS:**

1. Stuart J.Russel, Peter Norvig, "Artificial Intelligence A Modern Approach", Pearson Education, 2010.

#### **REFERENCES:**

1. Elaine Rich, Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata McGraw Hill, 2001.

**COURSE OBJECTIVES:**

- To serve as an introductory course to under graduate students with an emphasis on the design aspects of Data Mining and Data Warehousing
- To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication.
- To introduce the concept of data warehousing with special emphasis on architecture and design.
- Core topics like classification, clustering and association rules are exhaustively dealt with.
- Various association rules are to be discussed.
- Discuss recent trends in data mining

**COURSE OUTCOMES:**

- Understand why there is a need for data warehouse in addition to traditional operational database system
- Identify components in typical data warehouse architectures
- Understand why there is a need for data mining and in what ways it is different from traditional statistical techniques
- Understand the details of different algorithms
- Solve real data mining problems to find interesting patterns
- Understand a typical knowledge discovery process

**UNIT I DATA WAREHOUSING****(9)**

Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

**UNIT II BUSINESS ANALYSIS****(9)**

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools–OLAP Tools and the Internet.

**UNIT III DATA MINING****(9)**

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.

**UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION****(9)**

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification

and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction- Measuring the Dispersion of Data: Range, Quartiles, Variance, Standard Deviation, and Interquartile Range using WEKA

## **UNIT V CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING (9)**

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods - K- means – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications. Use WEKA for cleaning and integration

**Total hours:45**

### **TEXT BOOKS:**

- 1.Alex Berson and Stephen J. Smith, “ Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
- 2.Jiawei Han and MichelineKamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, 2007.

### **REFERENCES:**

- 1.Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “ Introduction To Data Mining”, Person Education, 2007.
- 2.K.P. Soman, ShyamDiwakar and V. Ajay “, Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
- 3.G. K. Gupta, “ Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
- 4.Daniel T.Larose, “Data Mining Methods and Models”, Wile-Interscience, 2006.

## **17BECS604B OBJECT ORIENTED ANALYSIS AND DESIGN**

**L T P C**

**3 0 0 3**

### **COURSE OBJECTIVES:**

- To understand the fundamentals of object modeling
- To understand and differentiate Unified Process from other approaches.
- To design with static UML diagrams.
- To design with the UML dynamic and implementation diagrams.
- To improve the software design with design patterns.
- To test the software against its requirements specification

### **COURSE OUTCOMES:**

- At the end of the course, the students will be able to:
- Express software design with UML diagrams
- Design software applications using OO concepts.
- Identify various scenarios based on software requirements
- Transform UML based software design into pattern based design using design patterns
- Understand the various testing methodologies for OO software

### **UNIT- I INTRODUCTION (9)**

An Overview of Object Oriented Systems Development - Object Basics – Object Oriented Systems Development Life Cycle.

### **UNIT- II OBJECT ORIENTED METHODOLOGIES (9)**

Rumbaugh Methodology - Booch Methodology - Jacobson Methodology - Patterns – Frameworks – Unified Approach – Unified Modeling Language – Use case - class diagram - Interactive Diagram - Package Diagram - Collaboration Diagram - State Diagram - Activity Diagram.

### **UNIT- III OBJECT ORIENTED ANALYSIS (9)**

Identifying use cases - Object Analysis - Classification – Identifying Object relationships - Attributes and Methods.

### **UNIT- IV OBJECT ORIENTED DESIGN (9)**

Design axioms - Designing Classes – Access Layer - Object Storage - Object Interoperability.

### **UNIT- V SOFTWARE QUALITY AND USABILITY (9)**

Designing Interface Objects – Software Quality Assurance – System Usability - Measuring User Satisfaction

**Total hours:45**

### **TEXT BOOKS:**

1. Ali Bahrami Object Oriented Systems Development Tata McGraw- Hill 2008
2. Martin Fowler Martin Fowler PHI/Pearson Education 2007

### **REFERENCES:**

1. Stephen R. Schach Introduction to Object Oriented Analysis and Design Tata McGraw-Hill 2003
2. James Rumbaugh, Ivar Jacobson, Grady Booch The Unified Modeling Language Reference Manual Addison Wesley 2005
3. Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado UML Toolkit OMG Press Wiley Publishing Inc 2004

**COURSE OBJECTIVES:**

- To learn how to use and manipulate several core data structures: Lists, Dictionaries, Tuples, and Strings. □
- To study decision structures and loops
- To understand the process and skills necessary to effectively deal with problem solving in relation to writing programs. □
- To understand the process and skills necessary to effectively deal with problem solving
- To discuss in relation to writing programs.
- To study various program object and graphics based on python

**COURSE OUTCOMES:**

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

- Develop algorithmic solutions to simple computational problems Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries
- Read and write data from/to files in Python Programs.
- Understand various program object and graphics based on python

**Theory Introduction and overview****(10)**

Introduction, What is Python, Origin, Comparison, Comments, Operators, Variables and Assignment, Numbers, Strings, Lists and Tuples, Dictionaries, if Statement, while Loop, for Loop and the range() Built-in Function, Files and the open() Built-in Function, Errors and Exceptions, Functions, Classes, Modules. Syntax and Style Statements and Syntax, Variable Assignment, Identifiers, Basic Style Guidelines, Memory Management, Python Application Examples.

**LIST OF EXPERIMENTS:**

1. Create a calculator program.
2. Explore String functions.
3. Implement sequential search.
4. Implement Selection sort.
5. Implement Stack.
6. Creating a CSV File based on user input.
7. Reading a CSV File already created and check for a specific pattern.

**Total Hours: 45****REFERENCES:**

1. Mark Lutz, "Programming Python", O'Reilly Media, 4<sup>th</sup> edition, 2010.
2. Mark Lutz, "Learning Python", O'Reilly Media, 5<sup>th</sup> Edition, 2013.
3. Tim Hall and J-P Stacey, "Python 3 for Absolute Beginners", Apress, 1<sup>st</sup> edition, 2009.
4. Magnus Lie Hetland, "Beginning Python: From Novice to Professional", Apress, Second Edition, 2005.
5. ShaiVaingast, "Beginning Python Visualization Crafting Visual Transformation Scripts", Apress, 2<sup>nd</sup> edition, 2014.

**COURSE OBJECTIVES:**

- Explain the basic concepts of Artificial Intelligence and its problem solving capacity
- Artificial Intelligence aims at developing computer applications, which encompasses perception, reasoning and learning
- To provide an in-depth understanding of major techniques used to simulate intelligence.
- To provide a strong foundation of fundamental concepts in Artificial Intelligence
- To provide a basic exposition to the goals and methods of Artificial Intelligence
- To enable the student to apply these techniques in applications which involve perception, Reasoning and learning.

**COURSE OUTCOMES:**

- Understand the history, development and various applications of artificial intelligence
- Familiarize with propositional and predicate logic and their roles in logic programming;
- Understand the programming language Prolog and write programs in declarative programming style;
- Learn the knowledge representation and reasoning techniques in rule-based systems, case based systems, and model-based systems;
- Appreciate how uncertainty is being tackled in the knowledge representation and reasoning process, in particular,
- Interpreted the techniques based on probability theory and possibility theory (fuzzy logic);

**LIST OF EXPERIMENTS:**

1. Implementation of Decision tree
2. Implementation of Regression Models
3. Implementation of Multi-Layer Perceptron
4. Classification using SVM
5. Implementation of Ada Boosting
6. Bagging using Random forests
7. Implementation of PCA for Dimensionality Reduction
8. Implementation of Factor Analysis
9. Implementation of K-Nearest Neighbor
10. Implementation of Hidden Markov modeling

**Total Hours: 45**

**COURSE OBJECTIVE:**

- To enable the students to create an awareness on engineering ethics, to install moral and social values and loyalty and to appreciate the rights of others
- To develop managerial and entrepreneurial skills our Culture and Ethics
- Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations.
- After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling.
- Student should understand concepts of directing and controlling
- To create an awareness and practice through Engineering Ethics and Human Values.

**COURSE OUTCOMES:**

- To Discuss and communicate the management evolution and how it will affect future managers.
- Identify and evaluate social responsibility and ethical issues involved in business situations and logically articulate own position on such issues.
- To Practice the process of management's four functions: planning, organizing, leading, and controlling.
- To evaluate leadership styles to anticipate the consequences of each leadership style.
- To understand the nature of professional responsibility and be able to identify the ethical elements in decisions.
- To develop critical thinking skills and professional judgment and understand practical difficulties of bringing about change.

**UNIT I      ENGINEERING ETHICS**

**(9)**

Senses of 'Engineering Ethics' – variety of moral issued – types of inquiry – moral dilemmas – moral autonomy – Kohlberg's theory – Gilligan's theory – consensus and controversy – Models of Professional Roles – theories about right action – Self-interest – customs and religion – uses of ethical theories.

**UNIT II      FACTORS OF CHANGES**

**(9)**

Forces that shape culture, social control – Meaning, Agencies, Institution, Customs, Values, Folkways, Norms and Laws.Social changes – Meaning and nature – Theories.

**UNIT III      HISTORICAL DEVELOPMENT, PLANNING, ORGANISING**

**(9)**

Definition of Management – Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Steps involved in Planning – Objectives – Setting Objectives – Process of Managing by Objectives – Strategies, Policies and Planning Premises– Forecasting – Decision-making – Formal and informal organization – Organization Chart –.

**UNIT IV      DIRECTING AND CONTROLLING**

**(9)**



Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Process of Communication – System and process of Controlling – Requirements for effective control – Control of Overall Performance – Direct and Preventive Control – Reporting

## **UNIT V      ENTREPRENEURSHIP AND MOTIVATION**

**(9)**

Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur – Entrepreneurship in Economic Growth– Major Motives Influencing an Entrepreneur – Achievement Motivation Training, self Rating, Business Game, Thematic Apperception Test – Stress management, Entrepreneurship Development Programs – Need, Objectives.

### **TEXT BOOKS:**

1. Harold Koontz & Heinz Weihrich Essentials of Management Tata McGraw-Hill, New Delhi. 2008
2. Khanka S.S Entrepreneurial Development S.Chand& Co. Ltd. Ram Nagar, NewDelhi. 1999
3. Mike Martin and Roland Schinzinger Ethics in Engineering McGraw-Hill, NewYork. 2005

### **REFERENCES:**

1. Tripathy P.C and Reddy P.N, Principles of Management Tata McGraw-Hill, New Delhi. 2007
2. Rabindra N Kanungo Entrepreneurship and innovation Sage Publications, New Delhi. 1998
3. Charles E Harris, Michael S. Protchard and Michael J Rabins Engineering Ethics – Concepts and Cases Wadsworth Thompson Learning, (Indian Reprint now available), New Delhi. 2000

### **WEBSITES:**

1. [http://www.managementstudyguide.com/taylor\\_fayol.htm](http://www.managementstudyguide.com/taylor_fayol.htm)
2. [http://tutor2u.net/business/gcse/people\\_motivation\\_theories.htm](http://tutor2u.net/business/gcse/people_motivation_theories.htm)
3. <http://lfkbb.tripod.com/eng24/gilliganstheory.html>
4. <http://www.developingeyes.com/five-types-of-entrepreneurs/>

**COURSE OBJECTIVES:**

- To learn the basic web concepts and Internet protocols.
- To understand CGI Concepts & CGI Programming.
- To familiarize with Scripting Languages.
- To discuss the concepts of DHTML
- To study XML, SERVELETS AND JSP.
- To discuss web pages based on various concepts of scripting, DHTML, XML, SERVELETS AND JSP.

**COURSE OUTCOMES:**

- Demonstrate an understanding of the components of a computer information networked system,
- To learn about application and softwares of Common gateway interface programming
- Create, install and update sophisticated web sites using various scripting languages
- Install and manage server software and other server-side tools using DHTML
- Develop web pages using Servlets and JSP
- Develop web pages based on various concepts of scripting, DHTML, XML, SERVELETS AND JSP.

**UNIT-I Introduction****(9)**

Internet Principles – Basic Web Concepts – Client/Server model – retrieving data from Internet – HTML and Scripting Languages – Standard Generalized Mark –up languages – Next Generation – Internet – Protocols and Applications.

**UNIT-II Common gateway interface programming****(9)**

CGI Concepts – HTML tags Emulation – Server – Browser Communication – E-mail generation – CGI client Side applets – CGI server applets – authorization and security.

**UNIT III Scripting languages****(9)**

HTML – forms – frames – tables – web page design- XML - JavaScript introduction – control structures – functions – arrays – objects – simple web applications

**UNIT IV Dynamic HTML****(9)**

Dynamic HTML – introduction – cascading style sheets – object model and collections – event model – filters and transition – data binding – data control – ActiveX control – handling of multimedia data

**UNIT V Servlets and JSP****(9)**

JSP Technology Introduction-JSP and Servlets- Running JSP Applications Basic JSP- JavaBeans Classes and JSP-Tag Libraries and Files- Support for the Model-View- Controller Paradigm- Case Study- Related Technologies.

**Total Hours: 45**

**TEXT BOOKS:**

1. Deitel H.M. and Deitel P.J., “Internet and World Wide Web How to program”, Pearson International, 2012, 4th Edition. (Ch-1,4,5,6,12,14,26,27)
2. UttamK.Roy, “Web Technologies”, Oxford University Press, 2011.

**REFERENCES:**

1. Gopalan N.P. and Akilandeswari J., “Web Technology”, Prentice Hall of India, 2011.(Ch- 1 to 11)
2. Paul Dietel and Harvey Deitel,”Java How to Program”, Prentice Hall of India, 8th Edition.(Ch-29),2012
3. Mahesh P. Matha, “Core Java A Comprehensive study”, Prentice Hall of India, 2011.
4. Thomno A. Powell,” The Complete Reference HTML and XHTML”, Tata McGraw Hill, 2008.

**WEBSITES:**

1. [www.wileyindia.com/web-technologies-html-javascript-php-java-jsp-xml](http://www.wileyindia.com/web-technologies-html-javascript-php-java-jsp-xml)
2. [www.comptechdoc.org/](http://www.comptechdoc.org/)

**COURSE OBJECTIVES:**

- To learn the basic web concepts and Internet protocols.
- To develop web page using HTML
- To familiarize with Scripting Languages.
- To study DHTML, XML, SERVELETS AND JSP.
- Create, install and update sophisticated web sites.
- Install and manage server software and other server side tools.

**COURSE OUTCOMES:**

- The students will be able to design Web pages using HTML/XML and style sheets
- Able to use XML to store and forwarding data.
- Students will find the ease of implementation of a website and the role of servlets in creating the dynamic websites
- The students will be able to write Client Server applications
- The students will be able to create dynamic web pages using server side scripting.
- Able to create a complete Web Application with all the required modules.

**LIST OF EXPERIMENTS**

1. Develop a web page using HTML with containing map with hot spots that hyperlinks to related information.
2. Develop a web page and use various CSS formatting options on the text.
3. Develop a web page and use external CSS formatting with different formatting options than the ones used in the previous experiment.
4. Develop a XSL parser for an XML document for data display.
5. Using CSS to format an XML Document
6. Develop a mechanism to validate user input at the client side using JavaScript.
7. Program to set a cookie using JavaScript
8. Develop a computer program that utilizes Java Applet technology to demonstrate some functions.
9. Developing a Java Applet that utilizes the Sound function and is included in the HTML document
10. Develop a mini web application of your choosing.

**Total Hours: 45**

**COURSE OBJECTIVES:**

- To explain the basics of software testing
- To highlight the strategies for software testing
- To stress the need and conduct of testing levels
- To identify the issues in testing management
- To bring out the ways and means of controlling and monitoring testing activity
- To identify and write the test plan, design test cases, document test cases using an open source test management tool.

**COURSE OUTCOMES:**

- Understand complete software testing life cycle.
- Demonstrate understanding of various terms and technologies used in testing domain using static testing.
- Demonstrate understanding of usage of testing framework, process and test management.
- Demonstrate understanding of generating test plan and designing test cases using test data management
- Demonstrate understanding of automated test management process using selenium.
- Given a business scenario, identify and write the test plan, design test cases, document test cases using an open source test management tool.

**UNIT- I      Introduction****(9)**

Introduction to Testing – why and what, Why is testing necessary? What is testing? Role of Tester, Testing and Quality, Overview of STLC, Software Testing Life Cycle - V model, SDLC vs STLC, different stages in STLC, document templates generated in different phases of STLC, different levels of testing, different types of testing

**UNIT -II      Static Testing****(9)**

Static Testing, Static techniques, reviews, walkthroughs, Basics of test design techniques, various test categories, test design techniques for different categories of tests. Designing test cases using MS-Excel.

**UNIT-III      Test Management****(9)**

Test management, Documenting test plan and test case, effort estimation, configuration management, project progress management. Use of Testopia for test case documentation and test management. Defect management, Test Execution, logging defects, defect lifecycle, fixing / closing defects. Use of Bugzilla for logging and tracing defects.

## **UNIT- IV Test Data Management**

**(9)**

Test Data Management, Test Data Management –Overview, Why Test Data Management, Test Data Types, Need for Test Data Setup, Test Data Setup Stages, Test data management Challenges. Creating sample test data using MS-Excel, Basics of Automation testing, Introduction to automation testing, why automation, what to automate, tools available for automation testing

## **UNIT- V Basics of Automation Testing Using Selenium**

**(9)**

Basics of Automation testing using Selenium, Introduction to Selenium, using Selenium IDE for automation testing, using Selenium Web driver for automation testing, understanding TestNG framework with Selenium Web driver for automation testing

**Total Hours: 45**

### **TEXT BOOKS:**

1. Rex Black, Managing the Testing Process (3rd edition), Wiley India Pvt Ltd (2009)

### **REFERENCES:**

1. Rex Black, Erik Van Veenendaal, Dorothy Graham, Foundations of software testing (3rd Edition ), Cengage Learning (2015)
2. Gauf Garrett Dustin, Implementing Automated Software Testing: How to Save Time and Lower Costs While Raising Quality (3rd edition), Addison-Wesley Professional (2009)

### **WEBSITES**

1. <http://docs.seleniumhq.org/docs/>
2. <http://www.seleniumhq.org/download/>

## **VALUE ADDED COURSES**

**COURSE OBJECTIVE:**

- To get knowledge about Concept of yoga
- To get knowledge about systems of yoga
- To get knowledge of different asanas
- To get knowledge of different advance asanas
- To get knowledge of pranayama
- To get knowledge mudras

**COURSE OUTCOME:**

Yoga Education Helps to Develop

- The Self Discipline,
- Self-Control,
- Physical health,
- Concentration
- Higher Level of Consciousness.
- Mental Health

**UNIT- I**

Introduction To Yoga- Meaning Of Yoga – Concept Of Yoga- Aim And Objectives Of Yoga –History Of Yoga - Systems Of Yoga.- Stages (Or) Limbs Of Yoga

**UNIT- II**

Asanas-Surya Namashkar- Thadasana- Veerabadhra Asana- Trikonasana- Utkatasana- ArdhaChakrasana- Ardha Kati Chakrasana- Thandasana- Gomugasana- Padmasana- Vajrasana- Paschimottasana- Matsyendrasana- BavanaMukthasana- SuptaPadhangusthasana-Sethubhandhasana- Navasana- ArdhaBavanamukthasana- Mathasyasana- Naukasana- Bujangasana- Salabasana- Makkarasana-Dhanurasana.

**UNIT- III**

Advance Asanas- Sirasasana- Garudasana- Natrajasana- Rajakoptasana- Chakrasana- Kukutasana- Virikshasana- Sarvagasana- Halasana-. Mayurasana .

**UNIT- IV**

Pranayama- Meaning- Types Of Pranayama- Bhastrika- Bhramari- Udgeeth- Kabalbhati- Bahya-AnulomVilom- Pranay Pranayama- Benefits Of Pranayama. Neti - JalaNeti , Sutra Neti, Nouli-Three Types, Douthy-Three Types

**UNIT- V**

Mudras- Uses Of Mudras- Gyan- Shoonya- Apaana- Prana- Vayu- Prithvi- Linga- Apana- Adi Mudra- - Agni Mudra- Surya Mudra- Varuna- Hakini Mudra.

**REFERENCES:**

- 1.Dr.K.Chandrasekaran, Sound Health Through Yoga, PremKalyan, 2009.
2. B.K.S.Iyengar, Light On Pranayama Crossroad Century, 2013.
3. ThirumularThirumandhiramSriramakrishna Math, 2016



**COURSE OBJECTIVES:**

- To explain relevance of Ethics while taking business decisions.
- To get knowledge of Entrepreneurship
- To get knowledge of business plan process
- To get knowledge of business plan components
- To learn about management and organization
- To study about government policy

**COURSE OUTCOMES:**

- To develop a business plan connected with ethics.
- To become Entrepreneur
- To analysis business plan process
- To analysis business plan components
- To build up management and organization plan
- To implement government policy

**Unit I**

Entrepreneurship – Types- Entrepreneurial Competencies -Business Plan – Meaning - Basic parameters - Project parameters - Factors of successful business - Term Loans and Working Capital Management.

**Unit II**

Business Plan Process - Sources of Information –Online Resources - Offline Resources - Sources of Market Research - Benefits of market study - Coverage of market study.

**Unit III**

Business Plan components - Company description - Industry Analysis- Target Market - Competition - Strategic position - Risk assessment - Technology plan - Management and Organization – Government policy

**Reference books:**

1. Rhonda Abrams " The Successful business Plan Secret \$ Strategies " Prentice Hall
2. Rhonda Abrams "The business plan in a day" Prentice Hall.
3. Business plan preparation - Entrepreneurship Development Institute of India

**COURSE OBJECTIVES:**

- To study the basic parts of computer in detail
- Introduce various peripheral devices available for computer and its detailed working concepts
- Overview of various interfaces and other hardware overview
- Assemble/setup and upgrade personal computer systems and discuss about power supplies and the skills to trouble-shoot various power-related problems.
- To study basic concepts and methods in troubleshooting
- To study the installation/connection and maintenance of computer and its associated peripherals.

**COURSE OUTCOME:**

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

- Identify the main components for the PC, familiarize themselves with PC memories such as RAM and ROM devices and so on.
- Identify various peripheral devices available and its working
- Understand various concepts of hardware and its interface and control
- Perform basic installation of PC. Importance of maintenance is understood
- Understand Various faults and failures are identified and troubleshooting in detail
- Understand overall PC hardware, interfacing, maintenance and troubleshooting

**UNIT I Introduction****(6)**

Introduction - Computer Organization – Number Systems and Codes – Memory – ALU – CU – Instruction prefetch – Interrupts – I/O Techniques – Device Controllers – Error Detection Techniques– Microprocessor – Personal Computer Concepts – Advanced System Concepts – Microcomputer Concepts – OS – Multitasking and Multiprogramming – Virtual Memory – Cache Memory – Modern PC and User.

**UNIT II Peripheral Devices****(6)**

Introduction – Keyboard – CRT Display Monitor – Printer – Magnetic Storage Devices – FDD – HDD – Special Types of Disk Drives – Mouse and Trackball – Modem – Fax-Modem – CD ROM Drive – Scanner – Digital Camera – DVD – Special Peripherals.

**UNIT III PC Hardware Overview****(6)**

Introduction – Hardware BIOS DOS Interaction – The PC family – PC hardware – Inside the System Box – Motherboard Logic – Memory Space – Peripheral Interfaces and Controllers – Keyboard Interface – CRT Display interface – FDC – HDC.

**UNIT IV Installation and Preventive Maintenance****(6)**

Introduction – system configuration – pre installation planning – Installation practice – routine checks – PC Assembling and integration – BIOS setup – Engineering versions and compatibility – preventive maintenance – DOS – Virus – Data Recovery.

## **UNIT V      Troubleshooting**

**(6)**

Introduction – computer faults – Nature of faults – Types of faults – Diagnostic programs and tools – Microprocessor and Firmware – Programmable LSI's – Bus Faults – Faults Elimination process – Systematic Troubleshooting – Symptoms observation and analysis – fault diagnosis – fault rectification – Troubleshooting levels – FDD, HDD, CD ROM Problems.

**Total Hours: 30**

### **TEXT BOOK:**

1. B. Govindarajalu, "IBM PC Clones Hardware, Troubleshooting and Maintenance", 2/E, TMH, 2002.

### **REFERENCES:**

1. Peter Abel, NiyazNizamuddin, "IMB PC Assembly Language and Programming", Pearson Education, 2007
2. Scott Mueller, "Repairing PC's", PHI, 1992

**COURSE OBJECTIVES:**

- Describe those aspects of mobile programming that make it unique from programming for other platforms
- Explain installation and working of Android
- Critique mobile applications on their design pros and cons
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- Program mobile applications for the Android operating system that use basic and advanced phone features
- Deploy applications to the Android marketplace for distribution.

**COURSE OUTCOMES:**

- Ability to install Android in Eclipse
- Understanding of the Android environment to develop projects
- Ability to develop simple Android projects
- Understanding of the android widgets and inclusion of it in projects
- Ability to create android application for playing audio and video files
- Ability to deploy application to the android market place for distribution

**LIST OF EXPERIMENTS**

1. Installation of Android in eclipse and study of Android Development Tools, Components and Architecture.
2. Creating and Running Android Virtual Device (AVD)
3. Running Hello World Android Project
4. Working with different Android User Interface
5. A simple android application to study various android widgets like text box, buttons, toggle Buttons and Images
6. Working with Android Activity life cycle
7. Working with intents
8. Working with fragments
9. Working with TTS engine in Android
10. A simple android application for playing audio and video files

**Total Hours: 30**

**COURSE OBJECTIVE:**

- To elevate the students into productivity powerhouses who can employ life skills to better their performances
- To bring out behavioral changes among the trainees so that they develop interpersonal, communication, team building skills and leadership skills.
- It helps the min enhancing productivity and performance at the workplace. The training helps them to acquire employability skills so that they can get employment easily.
- The objective of this course is to enhance the problem-solving skills in the areas of '**Quantitative Aptitude**' and '**Reasoning**' which will enable the students to achieve in **Campus Placements** and competitive examinations.
- To improve the logical thinking and mathematical ability of the students.
- To enable the students to give better presentation and explanation on their projects, posters and assignments – this makes them industry ready.

**COURSE OUTCOMES:**

- To solve basic and complex mathematical problems in short time.
- To perform well in various competitive exams and placement drives.
- To communicate with more confidence using better spoken and written English
- To give better presentation and explanation with the use of digital inventions
- During class time the students are expected to engage in group & pair work
- To perform well during Campus Drives and different Interviews

**UNIT I****(4)**

Overview to communication, self Introduction, Presentation on their own topic, Extempore, Group Activity

**UNIT II****(3)**

Group Discussion, Do's and Don'ts of Group Discussion, Body language, Grooming and Resume, Resume correction

**UNIT III****(4)**

Introduction to HRM – Questions - Do's and Don't's - Interview - Mock GD - Stress Management

**UNIT IV****(4)**

Personality Development - Presentation skills, Interpersonal skills, Critical thinking, Confidence building and Stress management.

**Total Hours:15****REFERENCES**

1. Barun K Mitra Personality Development and Soft Skills Oxford University Press-New Delhi 2012
2. Rajiv K. Mishra Personality Development Rupa& Co. 2012

### COURSE OBJECTIVES:

- To describe how networks impact our daily lives.
- To describe the role of data networking in the human network.
- To identify the key components of any data network.
- To describe network access, ethernet and network layers concept
- To describe the characteristics of network architectures: fault tolerance, scalability, quality of service and security.
- To devices that make up the network.

### COURSE OUTCOMES:

Upon completion of this course the student will be able to:

- Identify and describe internet architecture, structure, functions, components, and models;
- Describe the use of OSI and TCP layered models;
- Identify and describe the nature and roles of protocols and services at the application, network, data link, and physical layers;
- Describe principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations;
- Build simple LAN topologies by applying basic principles of cabling, device configuration, and IP subnetting
- To develop the applications of networks

### UNIT-1(3)

**Exploring the Network:** Globally Connected-LANs, WANs, and the Internet -The Network as a Platform-The Changing Network Environment, **Configuring a Network Operating System:** Introduction-IOS Bootcamp-Getting Basic-Addressing Schemes, **Network Protocols and Communications:** Rules of Communication-Network Protocols and Standards-Moving Data in the Network

### UNIT-2(4)

**Network Access:** Physical Layer Protocols-Network Media-Data Link Layer Protocols-Media Access Control, **Ethernet:** Introduction-Ethernet Protocol -Address Resolution Protocol -LAN Switches, **Network Layer-** Network Layer Protocols- Routing-Routers-Configuring a Cisco Router

### **UNIT-3(4)**

**Transport Layer:** Introduction-Transport Layer Protocols-TCP and UDP, **IP Addressing:** Introduction-IPv4 Network Addresses -IPv6 Network Addresses -Connectivity Verification, **Subnetting IP Networks:** Introduction-Subnetting IPv4 Network-Addressing Schemes-Design Considerations for IPv6

### **UNIT-4(4)**

**Application Layer:** Introduction-Application Layer Protocols -Well-Known Application Layer Protocols and Service -The Message Heard around the World, **It's a Network:** Introduction-Create and Grow-Keeping the Network Safe-Basic Network Performance-Managing IOS Configuration Files-Integrated Routing Services

**Total Hours:15**

### **REFERENCES:**

1. [Todd Lammle](#) , CCNA Routing and Switching Study Guide, Wiley; 1 edition, 2013.
2. [Wendell Odom](#) , Cisco Ccnet/CCNA Icnd1 100 - 101 Official Cert Guide, Pearson Education; 1 edition, 2013
3. [Wendell Odom](#), Cisco CCNA Routing and Switching Icnd2 200 - 101 Official Cert Guide, Pearson Education; 1 edition, 2013.
4. [Kevin Wallace](#), CCNP Routing and Switching ROUTE 300-101 Official Cert Guide, Cisco Press, 2014.

**COURSE OBJECTIVES:**

- To discuss the concepts of basic switched networks and configuration
- To describe the concepts of VLAN and routing concepts
- To describe Inter-VLAN Routing and static routing concepts
- To describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols.
- To analyze, configure, verify, and troubleshoot the primary routing protocols RIPv1, RIPv2, EIGRP, and OSPF.
- To Recognize and correct common routing issues and problems. Model and analyze routing processes.

**LEARNING OUTCOMES:**

Upon completion of this course the student will be able to:

- Describe the purpose, nature, and operations of a router; describe the purpose and nature of routing tables;
- Describe the purpose and procedure of configuring static routes;
- Develop Inter-VLAN Routing and static routing based applications
- Design and implement a classless IP addressing scheme for a given network;
- Describe the basis features and concepts of link-state routing protocols;
- Configure and verify basic RIPv1, RIPv2, single area OSPF, and EIGRP operations in a small routed network.

**UNIT-1****(3)**

**Introduction to Switched Networks**-Objectives-Key Terms-Introduction-LAN Design The Switched Environment. **Basic Switching Concepts and Configuration**-Objectives-Key Terms-Introduction-Basic Switch Configuration-Configure Switch Ports-Switch Security: Management and Implementation

**UNIT-2(3)**

**VLANs** Objectives-Key Terms-Introduction-VLAN Segmentation-VLANs in a Multiswitched Environment-VLAN Implementations-VLAN Trunks-Dynamic Trunking Protocol-Troubleshoot VLANs and Trunks-VLAN Security and Design-Design Best Practices for VLANs **Routing Concepts**-Objectives-Key Terms-Introduction-Functions of a Router Connect Devices-Basic Settings on a Router-Verify Connectivity of Directly Connected-Networks Switching Packets Between Networks-Path Determination-Analyze the Routing Table-Directly Connected Routes-Statically Learned Routes- Dynamic Routing Protocols

**UNIT-3(3)**



**Inter-VLAN Routing**-Objectives-Key Terms-Introduction-Inter-VLAN Routing Configuration-Configure Legacy Inter-VLAN Routing-Configure Router-on-a-Stick Inter-VLAN Routing Troubleshoot Inter-VLAN Routing-Layer 3 Switching-Troubleshoot Layer 3 Switching. **Static Routing**-Objectives-Key Terms-Introduction-Static Routing-Types of Static Routes-Configure IPv4 Static Routes-Configure IPv4 Default Routes-Configure IPv6 Static Routes -Configure IPv6 Default Routes-Review of CIDR and VLSM-CIDR-VLSM-Configure IPv6

#### **UNIT-4**

**(3)**

**Routing Dynamically**-Routing Dynamically-Dynamic Routing Protocol-Operation Dynamic Versus Static Routing-Routing Protocol Operating Fundamentals-Types of Routing Protocols -Distance Vector Routing Protocol Operation-Types of Distance Vector Routing Protocols-RIP and RIPng Routing-Configuring the RIPng Protocol-Link-State Dynamic Routing

**Single-Area OSPF**-Characteristics of OSPF-OSPF Messages-OSPF Operation-Configuring Single-Area-OSPFv2

#### **UNIT-5**

**(3)**

**Access Control Lists**-IP ACL Operation-Standard Versus Extended IPv4 ACLs-Wildcard Masks in ACLs-Guidelines for ACL Creation- Securing VTY Ports with a Standard IPv4 ACL-IPv6 ACLs.**DHCP**-Dynamic Host Configuration Protocol v4-Configuring a Basic DHCPv4 Server-Configure DHCPv4 Client-Troubleshoot DHCPv4. **Network Address Translation for IPv4** - NAT Operation-Types of NAT-Benefits of NAT-Configuring NAT- Configuring Dynamic NAT Configuring- Port Address Translation (PAT)-Port Forwarding

**Total Hours:15**

#### **REFERENCES:**

1. [Todd Lammle](#) , CCNA Routing and Switching Study Guide, Wiley; 1 edition, 2013.
2. [Wendell Odom](#) , Cisco Ccnet/CCNA Icnd1 100 - 101 Official Cert Guide, Pearson Education; 1 edition, 2013
3. [Wendell Odom](#), Cisco CCNA Routing and Switching Icnd2 200 - 101 Official Cert Guide, Pearson Education; 1 edition, 2013.
4. [Kevin Wallace](#), CCNP Routing and Switching ROUTE 300-101 Official Cert Guide, Cisco Press, 2014

**COMPUTER SCIENCE AND ENGINEERING**  
**PROFESSIONAL ELECTIVES**

**COURSE OBJECTIVES:**

- To enhance the students' knowledge of advanced data structures and algorithmic analysis
- To enhance their expertise in designing and analyzing implementations of data structures for different kinds of problems using heap structures.
- To increase the ability to summarize advanced tree concepts.
- To understand problem solving and applications of Set & Graph Algorithms
- To learn and compute advanced geometric algorithms.
- To explain applications of advanced data structures

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Understand the advanced concepts of data structures and algorithms
- Apply data structures to design and analyze and to solve problems using heap structures.
- Solve problems using the classical algorithms and tree data structures.
- Develop various problem-solving applications using Set & Graph Algorithms.
- Interpret and apply various advanced geometric algorithms
- Design and Implement advanced data structure applications.

**UNIT I Fundamentals****(9)**

Asymptotic Notations – Properties of Big-oh Notation – Conditional Asymptotic Notation – Algorithm Analysis – Amortized Analysis – Introduction to NP-Completeness/NP-Hard – Recurrence Equations – Solving Recurrence Equations

**UNIT II Heap Structures****(9)**

Priority Queues-Min/Max heaps – Leftist Heaps – Binomial Heaps – Fibonacci Heaps – Skew Heaps– lazy Binomial Heaps.

**UNIT III Trees****(9)**

Counting Binary Trees-Huffman coding – Red-Black trees – Multi-way Search Trees –B-Trees – Splay Trees – Tries.

**UNIT IV Set & Graph Algorithms****(9)**

Set ADT- Union & Find data structure and Applications- Graph traversals-DFS, BFS, Bi connected components, Cut vertices, Graph Matching, Network flow Problems

**UNIT V Geometric Algorithms(9)**

Segment Trees – 1-Dimensional Range Searching - k-d Trees – Line Segment Intersection – Convex Hulls - Computing the Overlay of Two Subdivisions - Range Trees – Voronoi Diagram.

**Total Hours: 45****TEXT BOOKS:**

1. T. Cormen, C. Leiserson, R. Rivest, C. Stein, Introduction to Algorithms, Prentice-Hall India, 2009.
2. Ellis Horowitz, Sartaj Sahni, Susan Anderson Freed, Fundamentals of Data Structures in C, Second Edition, University Press, 2008

**REFERENCES:**

1. Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, Data Structures using C and C++, Second Edition, PHI Learning Private Limited, 2010
2. Anany Levitin, Introduction to The Design & Analysis of Algorithms, Pearson Education, 3<sup>rd</sup> Edition, New Delhi, 2014.

3. AhoHopcroft and Ullman, "Data Structures and Algorithms, Pearson Education, 4<sup>th</sup> Edition, 2009.

**COURSE OBJECTIVES:**

- To understand the advanced concepts of computer, its design and the design of computer design.
- To elaborate advanced concepts of computer architecture, Parallel Processing, inter-processor communication and synchronization.
- To learn various concepts of the Instruction Level parallelism and its issues.
- To understand the different multiprocessor and multi-core architectures.
- To explain multi- core architecture and memory hierarchy design
- To study the Memory and I/O systems and its optimization.

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Demonstrate concepts of parallelism in hardware/software
- Understand the Concept of Parallel Processing and its applications
- Analyze the performance of different multiprocessor and multi-core architectures
- Develop the Pipelining Concept for a given set of Instructions
- Discuss memory organization and mapping techniques
- Describe architectural features of advanced processors.

**UNIT I Pipelining and ILP (9)**

Fundamentals of Computer Design - Measuring and Reporting Performance - Instruction Level Parallelism and Its Exploitation - Concepts and Challenges - Overcoming Data Hazards with Dynamic Scheduling – Dynamic Branch Prediction - Speculation - Multiple Issue Processors – Case Studies.

**UNIT II Advanced Techniques for Exploiting ILP (9)**

Compiler Techniques for Exposing ILP - Limitations on ILP for Realizable Processors - Hardware versus Software Speculation - Multithreading: Using ILP Support to Exploit Thread-level Parallelism - Performance and Efficiency in Advanced Multiple Issue Processors - Case Studies.

**UNIT III Multiprocessors (9)**

Symmetric and distributed shared memory architectures – Cache coherence issues - Performance Issues – Synchronization issues – Models of Memory Consistency - Interconnection networks – Buses, crossbar and multi-stage switches.

**UNIT IV     Multi-Core Architectures****(9)**

Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies  
– Intel Multi-core architecture – SUN CMP architecture – IBM cell architecture.- hp architecture.

**UNIT V     Memory Hierarchy Design****(9)**

Introduction - Optimizations of Cache Performance - Memory Technology and Optimizations -  
Protection: Virtual Memory and Virtual Machines - Design of Memory Hierarchies - Case Studies.

**Total Hours: 45****TEXT BOOKS:**

1. John L. Hennessey and David A. Patterson, Computer Architecture A Quantitative Approach, Morgan Kaufmann, New York 2006

**REFERENCES:**

1. Sima D, Fountain.T, and Kacsuk.P, Advanced Computer Architectures A Design Space Approach, Addison Wesley, New York. 2005
2. Kai Hwang, Advanced computer architecture Parallelism Scalability Programmability, Tata McGraw Hill, New Delhi2004
3. Vincent P. Heuring, Harry F.Jordan, Computer System Design and Architecture, Addison Wesley, New York. 2008
4. William Stallings, Computer Organization and Architecture – Designing for Performance, Pearson Education, Seventh Edition 2006

**COURSE OBJECTIVES:**

- To Understand the concept of Design patterns and their importance
- To explain various kinds of design patterns
- To Understand the behavioral knowledge of the patterns
- To explain about catalogs
- To Relate the Creational, Structural, behavioral Design patterns
- To Apply the suitable design patterns to refine the basic design for given context

**COURSE OUTCOMES:**

Upon Completion of this course the student will be able to

- Identify the appropriate design patterns to solve object-oriented design problems
- Develop design solutions using creational patterns
- Able to design various types of patterns design
- Apply structural patterns to solve design problems using catalogs
- Construct design solutions using advanced patterns
- Construct a design consisting of a collection of modules.

**UNIT I INTRODUCTION (9)**

History and Origin of Patterns – Applying Design Patterns – Prototyping –Testing.

**UNIT II DESIGN PATTERNS (9)**

Kinds of Pattern – Quality and Elements – Patterns and Rules – Creativity and Patterns– Creational Patterns – Structural Patterns – Behavioral Patterns, Factory Patterns

**UNIT III FRAMEWORKS (9)**

State and Strategy of Patterns.Singleton, Composite, Functions and the Command Patterns, Adaptor, Proxy Pattern, Decorator Pattern – Pattern Frameworks and Algorithms.

**UNIT IV CATALOGS (9)**

Pattern Catalogs and Writing Patterns, Patterns and Case Study

**UNIT V ADVANCED PATTERNS (9)**

Anti-Patterns - Case Studies In UML and CORBA, Pattern Community

**Total Hours: 45**

**TEXT BOOKS:**

1. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, Design Patterns: Elements of Reusable Object-oriented Software, Pearson Education, 2015
2. James W- Cooper, Java Design Patterns – A Tutorial, Addison-Wesley, 2015

**REFERENCES:**

1. Craig Larman, Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and the unified, Process, Pearson Education India, 2014
2. Mowbray, Inside CORBA, Pearson Education India, 2014



**COURSE OBJECTIVES:**

- To Introduce and describe current and emerging database models and technologies.
- To Design and implement relational database solutions for general applications.
- To Explain the query processing and techniques involved in query optimization
- To Explain common database administration tasks, such as database monitoring, performance tuning, data transfer, and security.
- To explain tools required for current issues in databases
- To Understand the concepts, current practices and issues of data warehouses and databases.

**COURSE OUTCOMES:**

Upon Completion of this course the student will be able to

- Know recent developments and current trend in database models.
- Develop applications for various relational databases
- Learn and optimize query processing techniques
- Evaluate designs and architectures for databases and data warehouses
- Analyze and develop tools for current issues in databases
- Organize strategic data in an enterprise and build a data Warehouse

## UNIT I      Relational Model Issues      (9)

ER Model – Normalization – Query processing – Query optimization – Transaction processing – Concurrency control – Recovery – Database tuning.

## UNIT II Distributed Databases (9)

Parallel databases – Inter and intra query parallelism – Distributed database features – Distributed database architecture – Fragmentation – Distributed query processing – Distributed transactions processing – Concurrency control – Recovery – Commit protocols

**UNIT III      Object Oriented Databases      (9)**

Introduction to object oriented databases – Approaches – Modeling and design – Persistence – Query languages – Transaction – Concurrency – Multi version locks – Recovery – POSTGRES – JASMINE – GEMSTONE – ODMG model.

**UNIT IV      Emerging Systems      (9)**

Enhanced data models – Client/Server model – Data warehousing and data mining – Web databases – Mobile databases – XML and web databases.

## **UNIT V      Current Issues**

**(9)**

Rules – Knowledge bases – Active and deductive databases – Multimedia databases – Multimedia data structures – Multimedia query languages – Spatial databases.

**Total Hours: 45**

### **TEXT BOOKS:**

1. Thomas Connolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Pearson Education 2009.

### **REFERENCES:**

1. R. Elmasri, S.B.Navathe, “Fundamentals of Database Systems”, 6<sup>th</sup> Edition, Pearson Education, 2011.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, 6 Edition, Tata McGraw Hill, 2010.
3. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, 8 Edition, Pearson Education, 2006.

**COURSE OBJECTIVES:**

- To learn the advance concepts of Operating Systems
- To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols
- To gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols
- To know the components and management aspects of Real time and Mobile operating systems
- To explain case studies in Linux, iOS and Android systems
- To explain real time operating systems

**COURSE OUTCOME:**

Upon Completion of the course, the students will be able to:

- Discuss the various synchronization, scheduling and memory management issues
- Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
- Discuss the various resource management techniques for distributed systems components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols
- Identify the different features of real time and mobile operating systems
- Install and use available open source kernel in Linux, iOS and Android systems
- Modify existing open source kernels in terms of functionality or features used.

**UNIT I FUNDAMENTALS OF OPERATING SYSTEMS**

(9)

Overview – Synchronization Mechanisms – Processes and Threads - Process Scheduling – Deadlocks: Detection, Prevention and Recovery – Models of Resources – Memory Management Techniques.

**UNIT II DISTRIBUTED OPERATING SYSTEMS**

(9)

Issues in Distributed Operating System – Architecture – Communication Primitives – Lamport's Logical clocks – Causal Ordering of Messages – Distributed Mutual Exclusion Algorithms – Centralized and Distributed Deadlock Detection Algorithms – Agreement Protocols.

**UNIT III DISTRIBUTED RESOURCE MANAGEMENT**

(9)

Distributed File Systems – Design Issues - Distributed Shared Memory – Algorithms for Implementing Distributed Shared memory–Issues in Load Distributing – Scheduling Algorithms – Synchronous and Asynchronous Check Pointing and Recovery – Fault Tolerance – Two-Phase Commit Protocol – Nonblocking Commit Protocol – Security and Protection.

**UNIT IV REAL TIME AND MOBILE OPERATING SYSTEMS**

(9)

Basic Model of Real Time Systems - Characteristics- Applications of Real Time Systems – Real Time Task Scheduling - Handling Resource Sharing - Mobile Operating Systems – Micro Kernel Design - Client Server Resource Access – Processes and Threads - Memory Management – File system.

## **UNIT V CASE STUDIES**

(9)

Linux System: Design Principles - Kernel Modules - Process Management Scheduling – Memory Management - Input-Output Management - File System - Interprocess Communication. iOS and Android: Architecture and SDK Framework - Media Layer - Services Layer - Core OS Layer – File System.

**Total Hours: 45**

### **TEXT BOOK:**

1. MukeshSinghal and Niranjan G. Shivaratri, “Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems”, Tata McGraw-Hill, 2001.

### **REFERENCES:**

1. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, “Operating System Concepts”, Seventh Edition, John Wiley & Sons, 2004.
2. Daniel P Bovet and Marco Cesati, “Understanding the Linux kernel”, 3rd edition, O’Reilly, 2005.
3. Rajib Mall, “Real-Time Systems: Theory and Practice”, Pearson Education India, 2006.
4. Neil Smyth, “iPhone iOS 4 Development Essentials – Xcode”, Fourth Edition, Payload media,

**COURSE OBJECTIVES:**

- To explain the fundamental concepts of the C# language and the .NET framework.
- Discuss the various types of Assemblies present
- To learn about server object types
- Learn about interfaces and collections in C# and .NET
- Learn basic concepts about IO Namespace and ADO .NET
- Learn about ASP.net and various web services which can be developed using it

**COURSE OUTCOMES:**

The main goal of the course is for students able to:

- Write clear and effective C# code and .Net.
- Gained knowledge about various types of Assemblies present and server objects
- Understood concepts of interface and collections in C# and .NET
- Develop web applications using ASP.NET Web Forms.
- Develop and use various ASP.NET Web Services.
- The student will gain knowledge in the concepts of the .NET framework as a whole and the technologies that constitute the framework.

**UNIT I Introduction****(9)**

Overview of .NET – Advantages of .NET over the other languages – Overview of .NET binaries – Intermediate Language – Metadata – .NET Namespaces – Common language runtime – Common type system – Common language specification – C# fundamentals – C# class – object – string formatting – Types – scope – Constants – C# iteration – Control flow – Operators – Array – String – Enumerations – Structures – Custom namespaces – Object oriented programming concepts – Class – Encapsulation – Inheritance – Polymorphic – Casting.

**UNIT II Assemblies****(9)**

Assemblies – Versioning – Attributes – Reflection – Viewing metadata – Type discovery – Reflecting on a type – Marshaling – Remoting – Understanding server object types – Specifying a server with an interface – Building a server – Building the client – Exception handling – Garbage collector.

**UNIT III Interfaces and Collections****(9)**

Interfaces and collections – Enumerator – Cloneable objects – Comparable objects – Collections – Indexes – Delegates – Events – Multithreaded programming. Programming with windows form controls – Windows form control Hierarchy – Adding controls – TextBox – CheckBoxes – RadioButtons – GroupBoxes – ListBoxes – ComboBoxes – TrackBar – Calendar – Spin Control – Panel – ToolTips – ErrorProvider – Dialog Boxes.

**UNIT IV IO Namespace and ADO .NET****(9)**

Input and output – Introduction to System. IO .namespace – File and folder operations – Stream class – Introduction to ADO .NET – Building data table – Data view – Data set – Data relations

– ADO.NET managed providers – OleDb managed provider – SQL.

**UNIT V      ASP .NET and Web Services**

**(9)**

Web development and ASP.NET – Web applications and web servers – HTML form development – Client side scripting – GET and POST – ASP.NET application – ASP.NET namespaces – creating sample C# web Applications. Understanding Web Security – Windows authentication – Forms authentication – Web services – Web services – Web service clients – The City View application.

**Total Hours: 45**

**TEXT BOOK:**

1. Andrew Troelsen, “C# and the .NET Platform”, A! Press, 6<sup>th</sup> edition, 2012.

**REFERENCE:**

1. Herbert Schildt, “The Complete Reference: C#”, Tata McGraw-Hill, 3<sup>rd</sup> edition, 2008.

### **COURSE OBJECTIVES:**

- Write servlets using the Java programming language (Java servlets)
- Understand and manage HTTP sessions in a web application
- Create servlet filters and listeners
- Write pages created with Java Server Pages technology (JSP pages)
- Create easy-to-maintain JSP pages using the Expression Language and the JSP Standard Tag Library (JSTL)
- Use integrated development environments (IDEs) and application servers for Java EE development and deployment

**COURSE OUTCOMES:**

- Construct and deploy small-to-medium scale web applications found in intranet and low-volume commercial sites by using JavaServer Page (JSP page) technology and servlets.
- Apply Model-View-Controller (MVC) architecture to projects in EE environments.
- Create servlet filters and listeners.
- Understand and manage HTTP sessions in a web application.
- Create easy-to-maintain JSP pages using Expression Language and the JSP Standard Tag Library (JSTL).
- Analyze, design, develop and deploy web applications with Java EE 6 SDK and the application server Oracle WebLogic Server

## UNIT I      SERVLETS      (9)

Web Application - Java Servlets - Servlet Lifecycle - Servlet Context - Session management - Building the first Servlet - Deploying the Servlet

## UNIT II INTRODUCTION TO JSP (9)

Introduction to Java Server Pages - Features of JSP - Basic HTML Tags - JSP Tag library - JSP Page Life cycle - Developing a Simple Java server Page - JSP Processing Model - Comments and Character Coding - MVC architecture - 3-tier architecture - Advantages of JSP over competing technologies

**UNIT III      JSP SCRIPTING ELEMENTS AND DIRECTIVES      (9)**

## Forms of Scripting Elements - Predefined Variables - Examples using Scripting Elements - JSP Directives - JSP Page Directive - JSP Include Directive

## UNIT IV JSP ACTIONS AND CUSTOM TAGS (9)

JSP Actions - include Action - forward Action - plugin Action - Java Beans - Bean Related – Actions - Custom Tag - Types of Tags - Creating Custom Tags

## **UNIT V      ADVANCE CUSTOM TAGS AND JSTL**

**(9)**

Introduction - Using Simple Tag - Using tag files - JSP Standard Tag Library –purpose JSTL -  
Using Expression Language - Using JSTL

**Total Hours: 45**

### **TEXT BOOKS:**

1. Mahesh P. Matha, “JSP and Servlets: A Comprehensive Study”, Prentice-Hall of India Pvt.Ltd, 2013.
2. Joel Murach and Michael Urban,” Murachs Java Servlets & JSP “, 3rd Edition, 2014.
3. Giulio Zamboni” Beginning JSP, JSF and Tomcat: Java Web Development”, Apress Kindle edition, 2012.

### **REFERENCES:**

1. Santosh Kumar K , “Jdbc, Servlets, And Jsp Black Book”, Dreamtech Press , New edition 2008.
2. Panduranga, S.N., Goyal, “Beginning Jsp 2”, Springer/A Press ,Edition1,2004.
3. Phil Hanna, “The Complete reference JSP 2.0”, Tata McGraw-Hill Education, 2003.

### **WEBSITES:**

1. [www.jsptut.com/](http://www.jsptut.com/)
2. [www.tutorialspoint.com/jsp/](http://www.tutorialspoint.com/jsp/)
3. [www.javatpoint.com/jsp-tutorial](http://www.javatpoint.com/jsp-tutorial)



**COURSE OBJECTIVES:**

- To study the concept of menus, windows, interfaces.
- To study the characteristics and components of windows.
- To study the various controls for the windows.
- To study about various problems in windows design with color, text, graphics
- To implement the basics and in-depth knowledge about UID.
- To enable the students to take up the design the user interface, design, menu creation and windows creation and connection between menu and windows

**COURSE OUTCOMES:**

Upon Completion of the course, the students will be able:

- To demonstrate knowledge of some theories of design of user interfaces
- To demonstrate knowledge of different interaction styles
- To analyze a user interface from a communication perspective
- To demonstrate an awareness of the relation between interaction design and user expectations.
- To design the user interface, design, menu creation and windows creation and connection between menu and windows.
- To study the Testing Methods.

**UNIT- I Introduction****(9)**

Introduction- Importance-Human-Computer interface-characteristics of graphics interface-Direct manipulation graphical system - web user interface-popularity-characteristic & principles.

**UNIT- II UI Design Process (9)**

User interface design process- obstacles-usability-human characteristics in design - Human interaction speed-business functions-requirement analysis-Direct-Indirect methods-basic business functions-Design standards-system timings - Human consideration in screen design - structures of menus - functions of menus-contents of menu-formatting -phrasing the menu - selecting menu choice-navigating menus-graphical menus.

**UNIT- III UI Controls (9)**

Windows: Characteristics-components-presentation styles-types-managements-organizations-operations-web systems-device-based controls: characteristics-Screen -based controls: operate control - text boxes-selection control-combination control-custom control-presentation control.

**UNIT- IV Web Page Designing****(9)**

Text for web pages - effective feedback-guidance & assistance-Internationalization-aaccessibility-Icons-Image-Multimedia -coloring.

**UNIT- V UI Tests (9)**

Windows layout-test: prototypes - kinds of tests - retest - Information search - visualization - Hypermedia - www - Software tools.

**Total Hours: 45**

**TEXT BOOKS:**

1. Wilbent. O. Galitz, The Essential Guide to User Interface Design, John Wiley& Sons, 2007

**REFERENCES:**

1. Ben Sheiderman, Design the User Interface, Pearson Education, 5<sup>th</sup> edition,2010
2. Alan Cooper, The Essential of User Interface Design, Wiley – Dream Tech Ltd,2002

**COURSE OBJECTIVES:**

- To understand the basics of Internet of Things
- To get an idea of some of the application areas where Internet of Things can be applied
- To understand the middleware for Internet of Things
- To understand the concepts of Web of Things
- To understand the concepts of Cloud of Things with emphasis on Mobile cloud computing
- To understand the IOT protocols

**COURSE OUTCOMES:**

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

- Understand the concepts of Internet of Things
- Identify and design the new models for various applications using IoT
- Design business intelligence and information security for WoB (Web of Things)
- Analyze various protocols for IoT
- Design a middleware for IoT
- Analyze and design different models for network dynamics

**UNIT I INTRODUCTION (10)**

Definitions and Functional Requirements –Motivation – Architecture - Web 3.0 View of IoT– Ubiquitous IoT Applications – Four Pillars of IoT – DNA of IoT - The Toolkit Approach for End-user Participation in the Internet of Things. Middleware for IoT: Overview – Communication middleware for IoT –IoT Information Security

**UNIT II IOT PROTOCOLS (8)**

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols –

Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security

**UNIT III WEB OF THINGS (10)**

Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing – Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture

**UNIT IV INTEGRATED (9)**

Integrated Billing Solutions in the Internet of Things Business Models for the Internet of Things - Network Dynamics: Population Models – Information Cascades - Network Effects - Network Dynamics: Structural Models - Cascading Behavior in Networks - The Small-World Phenomenon

**UNIT V APPLICATIONS (8)**

The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things: Clustering,

**TEXT BOOK:**

1. The Internet of Things in the Cloud: A Middleware Perspective - Honbo Zhou – CRC Press – 2012

**REFERENCES:**

1. Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles-(Eds.) – Springer – 2011
2. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press - 2010
3. The Internet of Things: Applications to the Smart Grid and Building Automation by - Olivier Hersent, Omar Elloumi and David Boswarthick - Wiley -2012
4. Olivier Hersent, David Boswarthick, Omar Elloumi, “The Internet of Things – Key applications and Protocols”, Wiley, 2012

**COURSE OBJECTIVES:**

- To expose the students to the layered architecture for communication networks
- To explain about Internet Routing protocols
- To discuss specific functionality of the network layer.
- To enable the student to understand the basic principles of routing and implementation in conventional networks and the evolving routing algorithms based on Internetworking requirements, optical backbone and the wireless access part of the network.
- Explain about mobile ad-hoc networks
- To enable the student to understand the different routing algorithms existing and their performance characteristics.

**COURSE OUTCOMES:**

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

- Understand layered architecture and its significance.
- Learn network layer and various routing techniques available.
- Apply knowledge for identifying a suitable routing algorithm, implementing it and analyzing its performance for any given network and user requirements and the type of channel over which the network has to operate,
- Design a new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.
- Compare Routing techniques and protocols.
- Acquire the knowledge of how data transfer happen in conventional networks.

**UNIT I Introduction****(7)**

ISO OSI Layer Architecture, TCP/IP Layer Architecture, Functions of Network layer, General Classification of routing, Routing in telephone networks, Dynamic Non hierarchical Routing (DNHR), Trunk status map routing (TSMR), real-time network routing (RTNR), Distance vector routing, Link staterouting, Hierarchical routing.

**UNIT II Internet Routing****(10)**

Interior protocol : Routing Information Protocol (RIP), Open Shortest Path First(OSPF), Bellman Ford Distance Vector Routing. Exterior Routing Protocols: Exterior Gateway Protocol (EGP) and Border Gateway Protocol (BGP). Multicast Routing: Pros and cons of Multicast and Multiple Unicast Routing, Distance Vector Multicast Routing Protocol (DVMRP), Multicast Open Shortest Path First (MOSPF), MBONE, Core Based Tree Routing.

**UNIT III Routing In Optical Wdm Networks****(10)**

Classification of RWA algorithms, RWA algorithms, Fairness and Admission Control, Distributed Control Protocols, Permanent Routing and Wavelength Requirements, Wavelength Rerouting-Benefits and Issues, Lightpath Migration, Rerouting Schemes, Algorithms- AG, MWPG.

**UNIT IV Mobile - IP Networks****(9)**

Macro-mobility Protocols, Micro-mobility protocol: Tunnel based : Hierarchical Mobile IP, Intra

domain Mobility Management, Routing based: Cellular IP, Handoff Wireless Access Internet Infrastructure (HAWAII).

## **UNIT V      Mobile Ad –Hoc Networks**

**(9)**

Internet-based mobile ad-hoc networking communication strategies, Routing algorithms – Proactive routing: destination sequenced Distance Vector Routing (DSDV), Reactive routing: Dynamic Source Routing (DSR), Ad hoc On-Demand Distance Vector Routing (AODV), Hybrid Routing: Zone Based Routing (ZRP).

**Total Hours: 45**

### **TEXT BOOKS:**

1. William Stallings, „High speed networks and Internets Performance and Quality of Service“, 2<sup>nd</sup> Edition, Pearson Education Asia. Reprint India 2002
2. M. Steen Strub, „Routing in Communication network, Prentice –Hall International, Newyork, 1995.

### **REFERENCES:**

1. S. Keshav, „An engineering approach to computer networking“ Addison Wesley 1999.
2. William Stallings, „High speed Networks TCP/IP and ATM Design Principles, Prentice-Hall, New York, 1995
3. C.E Perkins, „Ad Hoc Networking“, Addison – Wesley, 2001
4. Ian F. Akyildiz, Jiang Xie and Shantidev Mohanty, “A Survey of mobility Management in Next generation-All IP- Based Wireless Systems”, IEEE Wireless Communications Aug.2004, pp 16-27.
5. A.T Campbell et al., “Comparison of IP Micro mobility Protocols,” IEEE Wireless Communications Feb.2002, pp 72-82.
6. C.Siva Rama Murthy and Mohan Gurusamy, “ WDM Optical Networks – Concepts, Design and Algorithms”, Prentice Hall of India Pvt. Ltd, New Delhi –2002.

**COURSE OBJECTIVES:**

- To understand the fundamentals and acquire knowledge of the architectures of distributed systems.
- To gain knowledge of various remote procedure call models.
- To understand concepts of distributed shared memory systems.
- To make students aware about synchronization and management mechanism for distributed environment.
- To learn features of distributed file systems.
- To understand the security aspect of distributed systems.

**COURSE OUTCOMES:**

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

- Understand the principles and desired properties of distributed systems based on different application areas.
- Understand and apply the basic theoretical concepts and algorithms of distributed systems in problem solving.
- Learn the concepts of distributed shared memory systems.
- Analyze various synchronization and management techniques for distributed environment.
- Identify the features of distributed file systems.
- An ability to understand the security aspect of distributed systems.

**UNIT I            Fundamentals****(9)**

What is distributed computing systems – Evolution of distributed computing systems – Distributed computing system models – What is distributed operating system – Issues in designing distributed operating systems. Message passing – Features of a good message-passing system – Issues in IPC by message passing – Synchronization – Buffering – Multidatagram messages – Encoding and decoding of message data – Failure handling – Group communication.

**UNIT II           Remote Procedure Calls****(9)**

RPC Models – Transparency of RPC – Implementing RPC mechanism – Stub generation – RPC messages – Marshaling arguments & results – Server Management – Parameter-passing semantics – Call semantics – Communication protocols for RPCs – Complicated RPCs – Client server binding – Security – Special types of RPCs – Light weight RPC.

**UNIT III          Distributed Shared Memory****(9)**

General architecture of DSM systems – Design & implementation issues of DSM – Granularity – Structure of shared memory space – Consistency models – Replacement strategy – Thrashing – Heterogeneous DSM – Advantages of DSM.

**UNIT IV          Synchronization and Management****(9)**

Synchronization – Clock synchronization – Mutual exclusion – Election algorithms – Deadlocks.-  
Resource Management – Task assignment approach – Load balancing approach – Load sharing approach  
- Process Management – Process migration – Threads.

## **UNIT V      Distributed File Systems**

**(9)**

Desirable features of a good distributed file system – File models – File accessing models – File sharing semantics – File caching schemes – File replications – Fault tolerance – Atomic transaction.

**Total Hours: 45**

### **TEXT BOOK:**

1. Andrew S.Tanenbaum, and Steen, Maarten van, “Distributed Systems”, 2nd Edition, Prentice Hall of India, 2007

### **REFERENCES:**

1. Pradeep K Sinha, ”Distributed Operating Systems, Concepts & Design”, Prentice Hall of India, 2009.
2. Andrew S.Tanenbaum, ”Distributed Operating Systems”, Prentice Hall of India, 2005.



**COURSE OBJECTIVES:**

- To introduce big data & data analysis concepts
- To learn various techniques for mining data streams.
- To understand the models used for recognition of objects in videos.
- To learn Event Modeling for different applications.
- To acquire the knowledge of extracting information from surveillance videos.
- To discuss video analytic algorithms for business intelligence

**COURSE OUTCOMES:**

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

- Work with big data platform and its analysis techniques.
- Understand the approaches for identifying and tracking objects and person with motion based algorithms.
- Understand the algorithms available for searching and matching in video content.
- Analyze approaches for action representation and recognition.
- Identify, Analyze and apply algorithms for developing solutions for real world problems.
- Design video analytic algorithms for business intelligence

**UNIT I INTRODUCTION TO BIG DATA & DATA ANALYSIS(9)**

Introduction to Big Data Platform – Challenges of Conventional systems – Web data- Evolution of Analytic scalability- analytic processes and tools- Analysis Vs Reporting- Modern data analytic tools- Data Analysis: Regression Modeling- Bayesian Modeling- Rule induction.

**UNIT II MINING DATA STREAMS****(9)**

Introduction to Stream concepts- Stream data model and architecture – Stream Computing- Sampling data in a Stream- Filtering Streams- Counting distinct elements in a Stream- Estimating moments- Counting oneness in a window- Decaying window- Real time Analytics platform(RTAP) applications- case studies.

**UNIT III VIDEO ANALYTICS****(9)**

Introduction- Video Basics - Fundamentals for Video Surveillance- Scene Artifacts - Object Detection and Tracking: Adaptive Background Modelling and Subtraction- Pedestrian Detection and Tracking- Vehicle Detection and Tracking- Articulated Human Motion Tracking in Low- Dimensional Latent Spaces

#### **UNIT IV BEHAVIOURAL ANALYSIS & ACTIVITY RECOGNITION**

**(9)**

Event Modelling- Behavioural Analysis- Human Activity Recognition-Complex Activity Recognition- Activity modelling using 3D shape, Video summarization, shape based activity models- Suspicious Activity Detection

#### **UNIT V HUMAN FACE RECOGNITION & GAIT ANALYSIS**

**(9)**

Introduction: Overview of Recognition algorithms – Human Recognition using Face: Face Recognition from still images, Face Recognition from video, Evaluation of Face Recognition Technologies- Human Recognition using gait: HMM Framework for Gait Recognition, View Invariant Gait Recognition, Role of Shape and Dynamics in Gait Recognition

**Total Hours: 45**

#### **TEXT BOOK:**

1. Michael Berthold, David J.Hand, Intelligent Data Analysis, Springer, 2007.

#### **REFERENCES:**

1. AnandRajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.
2. Yunqian Ma, Gang Qian, “Intelligent Video Surveillance: Systems and Technology”, CRC Press (Taylor and Francis Group), 2009.
3. Rama Chellappa, AmitK.Roy-Chowdhury, Kevin Zhou.S, “Recognition of Humans and their Activities using Video”, Morgan&Claypool Publishers, 2005.

**COURSE OBJECTIVES:**

- To understand the concepts of wireless sensor networks.
- To learn how to program sensor nodes
- To understand the medium access protocol and address the physical layer issues.
- To learn network and transport layer protocols for sensor networks and design requirements.
- To understand the middleware and security issues of wireless sensor networks.
- To discuss the security issues in wireless sensor networks

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Apply knowledge of wireless sensor networks to various application areas.
- Design, implement and maintain wireless sensor networks.
- Define medium access layer issues.
- Address the transport protocol design issues.
- Design the efficient routing algorithm
- Analyze the security issues in wireless sensor networks

**UNIT I      Fundamentals of Sensor Networks      (9)**

Introduction and Overview - Overview of sensor network protocols, architecture, and applications, Challenges, Main features of WSNs; Research issues and trends, Platforms-Standards and specifications-IEEE802.15.4/Zigbee, Hardware: Telosb, Micaz motes ,Software: Overview of Embedded operating systems-Tiny OS, Introduction to Simulation tools- TOSSIM, OPNET, Ns-2.

**UNIT II      Communication Characteristics and Deployment Mechanisms      (9)**

Wireless Communication characteristics - Link quality, fading effects, Shadowing, Localization, Connectivity and Topology - Sensor deployment mechanisms, Coverage issues, Node discovery protocols.

**UNIT III      Mac Layer      (9)**

Fundamentals of Medium access protocol- Medium access layer protocols - Energy efficiency, Power allocation and Medium access control issues.

**UNIT IV      Network Layer and Transport Layer      (9)**

Network layer protocols-Data dissemination and processing, multichip and cluster based routing protocols- Energy efficient routing- Geographic routing, Transport layer- Transport protocol Design issues- Performance of Transport Control Protocols.

**UNIT V      Middleware and Security Issues      (9)**

Middleware and Application layer -Data dissemination, Data storage, Query processing, Security - Privacy issues, Attacks and Countermeasures

**TEXT BOOKS:**

1. WaltenegusDargie, Christian Poellabauer , “Fundamentals of Wireless Sensor Networks, Theory and Practice”, Wiley Series on wireless Communication and Mobile Computing, 2010.
2. KazemSohraby, Daniel manoli , “Wireless Sensor networks- Technology, Protocols and Applications”, Wiley InderScience Publications, 2010.

**REFERENCES:**

1. BhaskarKrishnamachari , “ Networking Wireless Sensors”, Cambridge University Press, 2011.
2. C.S Raghavendra, Krishna M.Sivalingam, Taiebznati , “Wireless Sensor Networks”, Springer Science, 2006.

**COURSE OBJECTIVES:**

- To gain knowledge of the basic concepts of SOA, comparison with older architectures and principles of service orientation.
- To learn about web services, messaging with SOAP and different layers of SOA.
- To learn about advanced concepts such as Orchestration and Choreography.
- To learn about various service-oriented analysis and design.
- To know about various WS- specification standards.
- To discuss the concept of Standards and Security on SOA.

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Obtain knowledge on basic concepts of SOA and how it differs with other architectures.
- Gain knowledge on advanced concepts of service composition, Orchestration and Choreography.
- Understand web service framework with respect to SOA.
- Acquire knowledge on various open standards available for developing SOA compliant web services.
- Design and implement Web based services using ASP.NET
- Appreciate the concept of Standards and Security on SOA.

**UNIT I Introduction (9)**

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation

**UNIT II Services (9)**

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer

**UNIT III Analysis (9)**

Service oriented analysis – Business-centric SOA – Deriving business services - service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task- centric business service design

**UNIT IV SOA (9)**

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for

XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

**UNIT V      WS**

**(9)**

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WS- Security

**Total Hours: 45**

**TEXT BOOKS:**

1. Thomas Erl, “Service-Oriented Architecture: Concepts, Technology, and Design”, Pearson Education, 2<sup>nd</sup> edition, 2016.
2. Judith Hurwitz, Robin Bloor, “Service Oriented Architecture for Dummies”, Willey Publications, 2<sup>nd</sup> edition, 2009

**REFERENCES:**

1. Nicolai M. Josuttis, “ SOA-The Art of Distributed System Design”, O’Reilly Publications, 2009.
2. Douglas K. Barry, “ Web Services, Service Oriented Architecture and Cloud Computing”, Elsevier Publications, 2<sup>nd</sup> Edition, 2013.

**COURSE OBJECTIVES:**

- To understand the concepts of software process and its models
- To understand software metrics and measurement.
- To learn quality assurance and various tools used in quality management.
- To learn in detail about various quality assurance models.
- To understand the audit and assessment procedures to achieve quality.
- To discuss construction of a quality model for a software development project.

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Understand in the context of software development projects, what approaches exist to manage the issues
- Identify the fundamental issues that a project manager has to consider, and describe, chiefly in the context of software development projects, what approaches exist to manage these issues
- Identify and analyze software project activities using contemporary work breakdown techniques
- Identify and apply selected techniques for estimating the effort and duration of project activities
- Construct a schedule of project activities using contemporary planning techniques
- Construct a quality model for a software development project, including identification of suitable quality attributes, suitable metrics for measuring these, and suitable threshold values for these metrics to indicate acceptable quality

**UNIT I Software Process and People Management**

**(9)**

Process Maturity – Capability Maturity Model (CMM) – Variations in CMM - Productivity improvement process. Organization structure – Difficulties in people management - Effective team building – Role of Project manager - Team structures – Comparison of different team structures.

**UNIT II Software Metrics**

**(9)**

Role of metrics in software development - Project metrics – Process metrics – Data gathering - Analysis of Data for measuring correctness, integrity, reliability and maintainability of Software products.

**UNIT III Project Management**

**(9)**

Project initiation – Feasibility study - Planning - Estimation - Resource allocation - RootCause Analysis.

**UNIT IV Risk Management**

**(9)**

Risk analysis and management - Types of Risk involved - RMM plan.

Scheduling - Critical path – Tracking - Timeline chart – Earned value chart. Baselines - Software configuration items - The SCM process- Version control- Change control -Configuration audit - SCM standards.

**Total Hours:45**

**TEXT BOOK:**

1. PankajJalote, “Software Project Management in practice”, Pearson Education, New Delhi, 2002.

**REFERENCES:**

1. Roger S Pressman, “Software Engineering, A Practitioner”s Approach” McGraw Hill Edition, New Delhi, 8<sup>th</sup> edition, 2014.
2. Watts Humphrey, “Managing the Software Process “, Pearson Education, New Delhi, 2000.



**COURSE OBJECTIVES:**

- To understand the IP addressing schemes.
- To learn the fundamentals of network design and implementation
- To understand the design and implementation of TCP/IP networks
- To learn the network management issues
- To understand the design and implement network applications.
- To discuss how to solve network management issues.

**COURSE OUTCOME:**

Upon completion of this course, the students will be able to:

- Design and implement TCP/IP networks.
- Explain network management issues.
- Develop data structures for basic protocol functions of TCP/IP.
- Apply the members in the respective structures.
- Design and implement data structures for maintaining multiple local and global timers.
- Able to solve network management issues.

**UNIT- I INTRODUCTION (9)**

Internetworking concepts and architectural model- classful Internet address – CIDR-Subnetting and Supernetting –ARP- RARP- IP – IP Routing –ICMP – Ipv6

**UNIT- II TCP (9)**

Services – header – connection establishment and termination- interactive data flow- bulk data flow- timeout and retransmission – persist timer - keepalive timer- futures and performance

**UNIT- III IP IMPLEMENTATION (9)**

IP global software organization – routing table- routing algorithms-fragmentation and reassembly- error processing (ICMP) –Multicast Processing (IGMP)

**UNIT- IV TCP IMPLEMENTATION I (9)**

Data structure and input processing – transmission control blocks- segment format- comparison-finite state machine implementation-Output processing- mutual exclusion-computing the TCP data length

**UNIT- V TCP IMPLEMENTATION II (9)**

Timers-events and messages- timer process- deleting and inserting timer event- flow control and adaptive retransmission-congestion avoidance and control – urgent data processing and push

function.

**Total Hours:45**

**TEXT BOOK:**

1. Douglas E.Comer, Internetworking with TCP/IP Principles Protocols and Architecture (4<sup>th</sup> edition), Pearson Education Asia, 2006

**REFERENCES:**

1. Forouzan, TCP/IP protocol suite (2<sup>nd</sup> Edition), TMH, 2005
2. W.Richard Stevens, TCP/IP illustrated, Pearson Education, 2003

**COURSE OBJECTIVES:**

- To explore the fundamental concepts of big data analytics
- To learn and analyze big data like Hadoop, NoSqlMapReduce.
- To understand the various search methods and visualization techniques.
- To learn the techniques and principles in achieving big data analytics with scalability and streaming capability
- To learn Hive and Pig scripts in the Hadoop environment.
- To discuss how to solve network management issues.

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Gain knowledge of Big Data and Hadoop ecosystem
- Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.
- Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
- Design and implement MapReduce programs and implementing HBase
- Implement Hive and Pig scripts in the Hadoop Environment.
- Discuss the Challenges and Solutions in Big Data.

**UNIT I Introduction to Big Data (9)**

Introduction to BigData Platform –Challenges of Conventional Systems -Intelligent data analysis – Nature of Data -Analytic Processes and Tools -Analysis vs Reporting-Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions -Re-Sampling -Statistical Inference -Prediction Error.

**UNIT II Mining Data Streams (9)**

Introduction To Streams Concepts –Stream Data Model and Architecture -Stream Computing - Sampling Data in a Stream –Filtering Streams –Counting Distinct Elements in a Stream –Estimating Moments –Counting Oneness in a Window –Decaying Window -Real time Analytics Platform(RTAP)Applications -Case Studies -Real Time Sentiment Analysis, Stock Market Predictions.

**UNIT III Hadoop (9)**

History of Hadoop-The Hadoop Distributed File System –Components of Hadoop-Analyzing the Data with Hadoop-Scaling Out-Hadoop Streaming-Design of HDFS-Java interfaces to HDFSBasics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort –Task execution -Map Reduce Types andFormats-Map Reduce Features

**UNIT IV Hadoop Environment (9)**

Setting up a Hadoop Cluster -Cluster specification -Cluster Setup and Installation –Hadoop Configuration-Security in Hadoop -Administering Hadoop –HDFS -Monitoring-Maintenance-Hadoop bench marks-Hadoop in the cloud

## **UNIT V      Frameworks**

**(9)**

Applications on Big Data Using Pig and Hive–Data processing operators in Pig –Hive services – HiveQL –Querying Data in Hive-fundamentals of HBase and ZooKeeper -IBM InfoSphereBigInsights and Streams. Visualizations-Visual data analysis techniques, interaction techniques;Systems and applications.

**Total Hours: 45**

### **TEXT BOOKS:**

1. Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoopand Streaming Data, Tata McGraw Hill Publications, 2011
2. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGrawHill Publishing,2012

### **REFERENCES:**

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. Tom White, “ Hadoop: The Definitive Guide”, Third Edition, O”reilly Media, 2012.
3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, JohnWiley& sons, 2012.
4. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
5. PeteWarden, “Big Data Glossary”, O”Reilly, 2011.
6. Paul Zikopoulos ,Dirk deRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles David Corrigan , Harness the Power of Big Data -The IBM Big Data Platform, Tata McGraw HillPublications, 2012
7. Michael Minelli, Michele Chambers, AmbigaDhiraj, Big Data, BigAnalytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses,WileyPublications,2013

**COURSE OBJECTIVES:**

- To learn Ad-Hoc Wireless Networks, Issues, and Classification of MAC Protocols.
- To understand the different types of AdHoc Routing Protocols and TCP overAdHoc Protocol.
- To understand about Sensor Network Architecture, its Applications and MAC Protocols for sensor networks.
- To learn the Different Issues in Wireless Sensor Routing and also Indoor and outdoor Localization and Quality of Service in WSN.
- To learn Mesh Networks , IEEE 802.11s Architecture and different types of Mesh Networks.
- Investigation of different protocols and mobile/wireless networks

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Gain the knowledge of Ad-Hoc Network and its issues.
- Identify the basic problems, limitations, strengths and current trends of mobile computing
- Analyze the current wireless networking mechanisms for mobile computing
- Analyze and critique the performance of different networks and algorithms for mobile Computing
- Develop an attitude to propose solutions with comparisons for problems related to mobile computing
- Investigation of different protocols and mobile/wireless networks

### UNIT I            **Ad-Hoc MAC** (9)

Issues in Ad-Hoc Wireless Networks. MAC Protocols – Issues, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.

### UNIT II            **Ad-Hoc Network Routing & TCP** (9)

Issues – Classifications of routing protocols – Hierarchical and Power aware. Multicast routing – Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc – Feedback based, TCP with explicit link, TCP-Bus, Ad Hoc TCP, and Split TCP.

### UNIT III            **WSN –MAC** (9)

Introduction – Sensor Network Architecture, Data dissemination, Gathering. MAC Protocols – self-organizing, Hybrid TDMA/FDMA and CSMA based MAC.

### UNIT IV            **WSN Routing, Localization & QOS** (9)

Issues in WSN routing – OLSR, AODV. Localization – Indoor and Sensor Network Localization. QoS in WSN.

### UNIT V            **Mesh Networks** (9)

Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture – Opportunistic routing – Self configuration and Auto configuration – Capacity Models – Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks.

**TEXT BOOK:**

1. C.Siva Ram Murthy and B.Smanoj, “ Ad Hoc Wireless Networks – Architectures and Protocols”, Pearson Education, 2011.

**REFERENCES:**

1. Feng Zhao and Leonidas Guibas, “Wireless Sensor Networks”, Morgan Kaufman Publishers, 2004.
2. C.K.Toh, “Ad Hoc Mobile Wireless Networks”, Pearson Education, 2002.
3. Thomas Krag and SebastinBuettrich, “Wireless Mesh Networking”, O”Reilly Publishers, 2007

**COURSE OBJECTIVES:**

- To learn the basic concepts of cloud computing.
- To learn types of cloud services and its applications.
- To understand the key components of Amazon Web Services.
- To collaborate with real time cloud services.
- To understand the security risk and application of cloud computing.
- To understand the security risk and application of cloud computing.

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Define basic concepts of cloud computing.
- Use and Examine different cloud computing services.
- Understand and appreciate the technological impact of service and cloud computing for future enterprises, and the technologies underpinning it.
- Describe importance of virtualization along with their technologies
- Analyze the key components of Amazon web Service
- Review and assess the risks, opportunities, costs and steps towards migrating existingsystems to service and cloud computing.

**UNIT- I Cloud Introduction (9)**

Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , usage scenarios and Applications, Business models around Cloud – Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus – Open Nebula, CloudSim.

**UNIT-II Cloud Services and File System (9)**

Types of Cloud services : Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services. Service providers - Google App Engine, Amazon EC2, Microsoft Azure, Sales force.Introduction to MapReduce, GFS, HDFS, Hadoop Framework.

**UNIT-III Collaborating with Cloud (9)**

Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing ,Databases – Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis.

**UNIT-IV Virtualization for Cloud (9)**

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

**UNIT-V Security, Standards, and Applications (9)**

Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

**TEXT BOOK:**

1. John Rittinghouse & James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press, 2010.

**REFERENCES:**

1. Bloor R., Kanfman M., Halper F. Judith Hurwitz "Cloud Computing for Dummies" (Wiley India Edition), 2010.
2. Antohy T Velte, Cloud Computing : "A Practical Approach", McGraw Hill, 2009.
3. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.
4. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006



**COURSE OBJECTIVES:**

- To understand the basics of Information Security and its model.
- To learn the legal, ethical and professional issues in Information Security
- To understand the need of risk management and risk control.
- To study the critical need for ensuring Information Security in Organizations.
- To learn the security policy, standards and security analyzing tools.
- To learn the security policy, standards and security analyzing tools.

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Analyze the appropriate techniques to tackle and solve problems in the discipline of information security management.
- Gain the knowledge of security and its management for any modern organization.
- Develop an understanding of security policies to implement, such policies in the form of message exchanges.
- Develop security management system should be planned, documented, implemented and improved, according to the security standard on information security management.
- Use and Examine the threats by security analysis tools
- Understand the CIA triad of Confidentiality, Integrity and Availability

**UNIT I Introduction (9)**

History, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC.

**UNIT II Security Investigation (9)**

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

**UNIT III Security Analysis (9)**

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

**UNIT IV Logical Design (9)**

Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity

**UNIT V Physical Design (9)**

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel

**TEXT BOOK:**

1. Michael E Whitman and Herbert J Mattord. “Principles of Information Security”, Second Edition, Vikas Publishing House, New Delhi, 2003.

**REFERENCES:**

1. Micki Krause, Harold F. Tipton, “ Handbook of Information Security Management”, Auerbach Publications, 4<sup>th</sup> edition, 2012.
2. Stuart McClure, Joel Scrambray, George Kurtz, “Hacking Exposed”, Tata McGraw-Hill, 7<sup>th</sup> edition, 2012.

**COURSE OBJECTIVES:**

- To learn basics of DevOps and its components.
- To discuss concepts of managing source code and automating builds
- To understand Configuration Management, Continuous Integration and Continuous Deployment, Continuous Delivery, Continuous Monitoring using DevOps tools-Git, Docker, Jenkins, Puppet and Nagios in practical, hands on and interactive approach.
- To understand automated testing and test-driven approach by various tool.
- To learn to create containers and dockers using different tools.
- To Understand continuous integration with Teamcity and jenkins.

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Analyze devOps and the modern devOps toolset
- Ability to automate all the aspects of a modern code delivery and deployment pipeline
- Use Source code management tools, build tools, Test automation tools using DevOps tools-Git, Docker, Jenkins, Puppet and Nagios for analysis
- Create containers and dockers using different tools.
- Configuring management tools.
- Integrate various module with Teamcity and Jenkins.

**Unit-1: Introduction to Devops**

What is DevOps? What are its components? Agile and DevOps: How do they inter-relate?-An understanding of DevOps-An understanding of the technical challenges in DevOps- An understanding of security issues-An understanding of the difference between requirements and architecture-How to write user acceptance tests-Hands on Projects/Tools covered: 1. Setup of the cloud environment. Demo is done with Google cloud, but devOps is agnostic of cloud type (AWS, Azure and GCP will all function the same way) 2. Tools: GCP/AWS/Azure

**Unit-2: Managing source code and automating builds**

How to manage change by setting up and using a source control system-How to automate the process of assembling software components with build tools-How to automate the building of the whole system with continuous integration tools-The major differences between popular tools: CVS, SVN, and Git-How to use Eclipse editor, Advantages of the Eclipse editor-Hands on Projects/Tools covered: 1. Concepts: Ticketing, Subversion, Using GIT, Java Profiling 2. Jenkins and Git 3. Tools Covered: SCCS and CVS, Subversion, Git, Maven, Make, JaCoCo, Ant, junit for Unit test,

SonarQube, Sqale, Structure 101 4. Hands on: Setup of Java sample program, Maven, path setup, Run Maven goals, Eclipse,

### **Unit- 3:Automated testing and Test driven development**

Principles of Test Driven Development-Benefits of Integrated Development Environments-How to perform Test Driven Development-Code quality-How to utilize code quality analysis tools-Hands on Projects/Tools covered: 1. Concepts: TDD Origins, IDEs, TDD, Approach, Behavior Driven Development, Code Quality Principles, Code Analysis Tools 2. Tools Covered: Eclipse, IntelliJ, Visual Studio, Xcode, xUnit, SQALE, SonarQube, JaCoCo 3. Hands on: Complete setup of the automated test environment and running it.

### **Unit-4:Containerization using Docker**

What are containers? Why are they used?-Introduction to Docker?-Image distribution and Docker containers?-Creating and managing remote docker instances?-Understanding Docker Networking, Volumes and Files-Hands on Projects/Tools covered: 1. Concepts: Dockercontainers,image creation and docker instance handling, Dockernetworking,volumes and files 2. Tools Covered: Docker 3. Hands on: Working on Docker containers, images, and registry

### **Unit-5:Continuous integration**

Continuous integration with Team city-Integration of Eclipse with Teamcity-Continuous integration with Jenkins

### **REFERENCE BOOKS:**

1. Joakim Verona , Practical DevOps, Packt Publishing Limited, 2016
2. John Allspaw , Gene Kim, The Devops Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, IT Revolution Press, 2016.
3. Karl Matthias, Docker: Up and Running, Shroff, 2015

**COURSE OBJECTIVES:**

- To understand the basic concepts and layers of semantic web.
- To learn RDF data models and querying the semantic web using SPARQL
- To learn Ontology Engineering, construction and reusing.
- To understand the description logics and monotonic rules.
- To learn Social Network Analysis and semantic web
- To discuss application of Semantic web technologies to real world applications.

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Describe the rationale behind Semantic Web.
- Model ontologies using Resource Description Framework (RDF).
- Design RDF Schemas for ontologies.
- Model and design ontologies using Web Ontology Language (OWL).
- Query ontologies using SPARQL.
- Apply Semantic web technologies to real world applications.

**UNIT 1 INTRODUCTION****(9)**

History – Semantic web layers –Semantic web technologies – Semantics in semantic web – XML: Structuring – Namespaces – Addressing – Querying-Processing XML.

**UNIT II Rdf and Querying the Semantic Web****(9)**

RDF data model-syntaxes-Adding semantics -RDF schema-RDF and RDF schema in RDF schema-An axiomatic semantics for RDF and RDF schema-Querying the semantic web-SPARQL-Basics-Filters-Constructs-Organizing result sets-Querying schemas.

**UNIT III Ontology****(9)**

Introduction – Ontology movement – OWL – OWL specification - OWL elements – OWL constructs: Simple and complex – Ontology engineering: Introduction – Constructing ontologies – Reusing ontologies – On-To-Knowledge semantic web architecture

**UNIT IV Logic and Inference****(9)**

Logic – Description logics - Rules – Monotonic rules: syntax, semantics and examples – Non-monotonic rules – Motivation, syntax, and examples – Rule markup in XML: Monotonic rules - Non-Monotonic rules

**UNIT V Applications of Semantic Web Technologies****(9)**

Good relations-BBC artists-BBC world cup 2010 website-Government data, Newyork times-Sigma and sindiceopen Calais-schema.org-Future of semantic web

**Total Hours - 45**

**TEXT BOOKS:**

1. Grigorous Antoniou and Van Hermelen, A Semantic Web Primer. New Delhi: The MIT Press, 2012.
2. James Hendler, Henry Lieberman and Wolfgang Wahlster, Spinning the Semantic Web: Bringing the World Wide Web to its full potential. New Delhi: The MIT Press, 2005.

**REFERENCES:**

1. Shelley Powers, Practical RDF. Mumbai: O'reilly publishers, 2009
2. Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, Foundations of Semantic Web Technologies, Chapman & Hall/CRC, 2009

**COURSE OBJECTIVES:**

- To understand the basic concepts of E-commerce and its values.
- To learn key features of Internet, Intranets and Extranets and explain how they relate to each other
- To understand web servers, protocol and EC software.
- To obtain the knowledge of online security issues to assess existing websites.
- To understand the web-based marketing and its advantages
- To discuss the use of a social media technology in a business or government application

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Demonstrate an understanding of the foundations and importance of E-commerce.
- Describe the infrastructure required for E-commerce.
- Describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.
- Analyze the online threats and strategies for marketing.
- Discuss legal issues and privacy in E-Commerce.
- Demonstrate the use of a social media technology in a business or government application

**UNIT I INTRODUCTION (9)**

Traditional commerce and E commerce – Internet and WWW – role of WWW – value chains – strategic business and Industry value chains – role of E commerce.

**UNIT II INFRASTRUCTURE FOR E COMMERCE (9)**

Packet switched networks – TCP/IP protocol script – Internet utility programmes – SGML, HTML and XML – web client and servers – Web client/server architecture – intranet and extranets.

**UNIT III WEB BASED TOOLS FOR E COMMERCE (9)**

Web server – performance evaluation - web server software feature sets – web server software and tools – web protocol – search engines – intelligent agents –EC software – web hosting – cost analysis

**UNIT IV SECURITY (9)**

Computer security classification – copy right and Intellectual property – electronic commerce threats – protecting client computers – electronic payment systems – electronic cash – strategies for marketing – sales and promotion – cryptography – authentication.

**UNIT V INTELLIGENT AGENTS (9)**

Definition and capabilities – limitation of agents – security – web based marketing – search engines and Directory registration – online advertisements – Portables and info mechanics – website design issues.

**Total Hours - 45**

**TEXT BOOKS:**

1. Ravi Kalakota, “ Electronic Commerce”, Pearson Education,
2. Gary P Schneider “Electronic commerce”, Thomson learning & James T Peny Cambridge USA, 2001.
3. Manlyn Greenstein and Miklos “Electronic commerce” McGraw-Hill, 2002.

**REFERENCES:**

1. EfraimTurvanJ.Lee, David kug and chung, “Electronic commerce” Pearson Education Asia 2001.
2. Brenda Kienew E commerce Business Prentice Hall, 2001.



**COURSE OBJECTIVES:**

- To understand the concepts relating to the design of human-computer interfaces in ways making computer-based systems comprehensive, friendly and usable.
- To understand the design and evaluation of interactive systems
- To understand various universal design principles and multimodal systems
- To understand the theoretical dimensions of human factors involved in the acceptance of computer interfaces.
- To understand the important aspects of implementation of human-computer interface

**COURSE OUTCOMES:**

- Understand key aspects of human psychology which can determine user actions at and satisfaction of the interface.
- Describe the key design principles for user interfaces.
- Set up and carry out a process to gather requirements for, engage in iterative design of, and evaluate the usability of a user interface.
- Describe how user interface development can be integrated into an overall software development process.
- Understanding of the ethical issues involved in testing user interfaces.
- Apply Human Computer Interface in real time applications

**UNIT I      Design Process (9)**

Humans – Information Process – Computer – Information Process – Differences and Similarities – Need for Interaction – Models – Ergonomics – Style – Context – Paradigms – Designing of Interactive Systems – Usability – Paradigm shift – Interaction Design Basics – Design Process – Scenarios – Users Need –Complexity of Design

**UNIT II      Design and Evaluation of Interactive Systems (9)**

Software Process – Usability Engineering – Issue based Information Systems – Iterative Design Practices – Design Rules – Maximum Usability – Principles – Standards and Guidelines – Design Patterns – Programming Tools – Windowing Systems – Interaction Tool Kit – User Interface Management System – Evaluation Techniques – Evaluation Design – Evaluating Implementations – Observational Methods.

**UNIT III      Models (9)**

Universal Design Principles – Multimodal Systems – User Support – Presentation and Implementation Issues – Types – Requirements – Approaches – Cognitive Model – Hierarchical Model – Linguistic Model – Physical and Device Models – Socio technical Models – Communication and Collaboration Models – Task Models – Task Analysis And Design.

## **UNIT IV Experimental Design and Statistical Analysis of HCI**

**(9)**

Basic Design Structure – Single Independent Variable – Multiple Independent Variable – Factorial Design – Split-Plot Design – Random Errors – Experimental Procedure – Statistical Analysis – T Tests – Analysis of Variance Test – Regression – Chi-Square Test – Survey – Probabilistic Sampling – Non-Probabilistic Sampling – Developing Survey Questions.

## **UNIT V Theories**

**(9)**

Dialogue Notations and Design – Dialogue Need – Dialogue Design Notations – Graphical – Textual - Representing Dialogue – Formal Descriptions – Dialogue Analysis – System Models – Interaction Models – Relationship with Dialogue – Formalisms – Formal Notations – Interstitial Behavior – Virtual Reality – Modeling Rich Interaction – Status Event Analysis – Properties – Rich Contexts – Sensor-based Systems – Groupware – Applications – Ubiquitous Computing – Virtual Reality

**Total Hours:45**

### **TEXT BOOKS:**

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, “Human Computer Interaction”, Third Edition, Prentice Hall, 2004.

### **REFERENCES:**

1. Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, “Research Methods in Human Computer Interaction”, Wiley, 2010.
2. Ben Shneiderman and Catherine Plaisant, “Designing the User Interface: Strategies for Effective Human-Computer Interaction”, Fifth Edition, Addison-Wesley Publishing Co, 2010.

**COURSE OBJECTIVES:**

- To understand Overview and Language Modeling
- To understand the various levels of analysis involved in NLP.
- To learn language modeling.
- To gain knowledge in automated natural language generation and machine translation.
- To understand the concepts of information Retrieval and Lexical resource.
- To discuss concepts of Natural Language Processing in real time application

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Compose key NLP elements to develop higher level processing chains
- Assess / Evaluate NLP based systems
- Choose appropriate solutions for solving typical NLP sub problems (tokenizing, tagging, parsing)
- Describe the Machine translation approaches.
- Gain knowledge in design features in information retrieval and lexical analysis techniques.
- Analyze Natural Language Processing in real time application

**UNIT I OVERVIEW AND LANGUAGE MODELING****(9)**

OVERVIEW: Origins and challenges of NLP- Language and Grammar- Processing Indian Languages-NLP Applications-Information Retrieval.

LANGUAGE MODELING: Introduction-Variety Grammar-based Language Models-Statistical Language Model.

**UNIT II Word Level and Syntactic Analysis****(9)**

WORD LEVEL ANALYSIS: Introduction- Regular Expressions-Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes-Part-of Speech Tagging. SYNTACTIC ANALYSIS: Introduction-Context-free Grammar-Constituency-Parsing-Probabilistic Parsing.

**UNIT III Semantic Analysis and Discourse Processing****(9)**

SEMANTIC ANALYSIS: Introduction- Meaning Representation-Lexical Semantics- Ambiguity-Word Sense Disambiguation. DISCOURSE PROCESSING: Introduction- cohesion-Reference Resolution- Discourse Coherence and Structure.

**UNIT IV Natural Language Generation and Machine Translation****(9)**

NATURAL LANGUAGE GENERATION: Introduction-Architecture of NLG Systems- Generation Tasks and Representations-Application of NLG.MACHINE TRANSLATION: Introduction-Problems in Machine Translation- Characteristics of Indian Languages- Machine Translation Approaches-Translation involving Indian Languages.

**INFORMATION RETRIEVAL:** Introduction -Design features of Information Retrieval Systems- Classical, Non-classical, Alternative Models of Information Retrieval – Evaluation. **LEXICAL RESOURCES:** Introduction-WordNet-FrameNet-Stemmers-POS Tagger- Research Corpora.

**Total Hours: 45**

**TEXT BOOKS:**

1. TanveerSiddiqui, U.S. Tiwary, “Natural Language Processing and Information Retrieval”, Oxford University Press, 2008.

**REFERENCES:**

1. Daniel Jurafsky and James H Martin, “Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition”, Prentice Hall, 2nd Edition, 2008.
2. James Allen, Benjamin/cummings, “Natural Language Understanding”, 2nd edition, 1995.

### **COURSE OBJECTIVES:**

- To learn strategic understanding of Digital Marketing
- To understand how to use optimize the search engine
- To learn marketing and tracking metrics
- To learn how digital marketing use social media and strategies for digital marketing.
- To explain about email marketing, display advertising, mobile marketing, strategy & planning
- To explain the applications of digital marketing

### **COURSE OUTCOMES:**

Upon completion of this course, the students will be able to

- Define and outline key concept related to digital marketing
- Categorize digital marketing concepts including e-business models, e-consumer behaviour, online marketing communications, website design and social media marketing.
- Critically assess the role that digital marketing can play in business strategy
- Develop tactical decisions concerning effective product, pricing, distribution and promotion decisions in digital marketing
- Reflect on the practical implementation of a digital marketing strategy from a critical and evaluative perspective
- Develop applications like email marketing, display advertising, mobile marketing, strategy & planning

#### **Unit-1: Introduction to Digital Marketing**

Strategies in Digital Marketing-Aligning Internet with Business Objectives-Examples of Great Case Studies-User Behaviour& Navigation-Branding & User Experience

#### **Unit-2: Search Engine Optimisation**

Stakeholders in Search-Customer Insights-On & off-page Optimisation-Meta Tags, Layout, Content Updates-Inbound Links & Link Building

#### **Unit-3: Search Marketing and Web Site Analytics**

Campaign Management-Conversion Tracking-Targeting & Analytics-Keyword Selection-Conversion Metrics: CPA, CTR, Goal Configuration & Funnels-Intelligence Reporting-Conversions, Bounce Rate, Traffic Sources, Scheduling etc

#### **Unit-4: Social Media**

What is Social Media Marketing?-Overview of Facebook, Twitter, LinkedIn, Blogging, Youtube and Flickr Building Brand Awareness Using Social Media, Social Media Management-Insights and Analytics-Best Practice Examples & case Studies

## **Unit-5: Email Marketing, Display advertising, Mobile Marketing, Strategy & Planning**

User Behaviour-Segmentation, Key Metrics-Best Practice Case Studies-Split Testing-Campaign Process Optimisation, SMS Strategy-Mobile Advertising - Mobile Optimized Websites-7 Step Process for Mobile Apps • Proximity Marketing -Strategic Steps -Review & Testing, Tracking your Campaign -Optimizing the Campaign- Campaign Planning -Running Effective Ads, Situation Analysis, Planning, Budget, Measurement - Information Gathering & Research - Key Strategy & Planning Concepts & Methodologies - Best Practice Case Studies.

### **Reference Books:**

1. Ian Dodson , The Art of Digital Marketing Hardcover, 2016.
2. SudhirSreedharan, Digital Marketing Paperback – Import, 2015
3. Akins Homlon, Quickwin Digital Marketing - Answers To Your, 2012.
4. Philip Kotler , Marketing 4.0: Moving from Traditional to Digital Hardcover, 2017.

**OPEN ELECTIVES OFFERED BY  
COMPUTER SCIENCE AND ENGINEERING**

**COURSE OBJECTIVES:**

- To study concepts of Internet, IP addresses and protocols
- To explain the concept of web page development through HTML
- To introduce the PERL and explore its current strengths and Weaknesses
- To write working Java code to demonstrate the use of applets for client side programming
- To study Internet telephony and various multimedia applications
- To Elaborate on the principles of web page development

**COURSE OUTCOMES:**

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

- Learn the advanced concepts& techniques of Internet and Java.
- Analyze the requirements for and create and implement the principles of web page development
- Understand the concepts of PERL
- Implement client side programming using java applets
- Generate internet telephony based upon advanced concepts
- Develop applications on internet programming based on java applets and scripts

**UNIT I Introduction****(9)**

Introduction - Network of Networks, Intranet, Extranet and Internet. World Wide Web- Domain and Sub domain, Address Resolution, DNS, Telnet, FTP, HTTP. TCP/IP- Features, Segment, Three-Way Handshaking, Flow Control, Error Control, Congestion control, IP Datagram, IPv4 and IPv6. IP Subnetting and addressing- Classful and Classless Addressing, Subnetting

**UNIT II HTML (9)**

Introduction, Editors, Elements, Attributes, Heading, Paragraph. Formatting, Link, Head, Table, List, Block, Layout, CSS. Form, Iframe, Colors, Colorname, Colorvalue. Image Maps- map, area, attributes of image area- Extensible Markup Language (XML)- Introduction, Tree, Syntax, Elements, Attributes, Validation, Viewing. XHTML in brief. CGI Scripts- Introduction- Environment Variable, GET and POST Methods.

**UNIT III PERL****(9)**

Introduction, Variable, Condition, Loop, Array, Implementing data structure, Hash, String, Regular Expression, File handling, I/O handling- JavaScript- Basics, Statements, comments, variable, comparison, condition, switch, loop, break. Object – string, array, Boolean, reg-ex. Function, Errors, Validation. Cookies- Definition of cookies, Create and Store a cookie with example. Java Applets- Container Class, Components, Applet Life Cycle, Update method, Applications.

**UNIT IV Client-Server programming****(9)**

Client-Server programming In Java - Java Socket, Java RMI. Threats - Malicious code-viruses, Trojan horses, worms; eavesdropping, spoofing, modification, denial of service attacks- Network security techniques- Password and Authentication- VPN, IP Security, security in electronic transaction, Secure Socket Layer (SSL), Secure Shell (SSH). Firewall- Introduction, Packet filtering,



Stateful, Application layer, Proxy.

## **UNIT V Internet Telephony (9)**

Introduction, VoIP- Multimedia Applications- Multimedia over IP: RSVP, RTP, RTCP and RTSP- Streaming media, Codec and Plugins, IPTV- Search Engine and Web Crawler- Definition, Meta data, Web Crawler, Indexing, Page rank, overview of SEO.

**Total Hours: 45**

### **TEXT BOOKS:**

1. Paul Deitel, Harvey Deitel and Abby Deitel, “Internet and World Wide Web-How to Program”, 5th Edition, 2011.
2. Web Technology: A Developer's Perspective, N.P. Gopalan and J. Akilandeswari, PHI Learning, Delhi, 2013.

### **REFERENCES:**

1. Rahul Banerjee, Internetworking Technologies, An Engineering Perspective, PHI Learning, Delhi, 2011.
2. Robert W. Sebesta, “Programming the World Wide Web”, Pearson Education, 2016

**COURSE OBJECTIVES:**

- To impart the fundamental concepts of Computer Animation and Multimedia
- To study the graphic techniques and algorithms using flash
- Explain various concepts available in 3D animation
- Explain various devices available for animation
- To study the multimedia concepts and various I/O technologies for concept development
- To understand the three-dimensional graphics and their transformations

**COURSE OUTCOMES**

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

- Develop their creativity using animation and multimedia
- Understand the concepts of Flash and able to develop animation using it
- Understand about various latest interactive 3D animation concepts
- Know the various devices and software available in motion capture
- Understand the concept development process
- Develop an interactive multimedia presentation by using multimedia devices and identify theoretical and practical aspects in designing multimedia applications surrounding the emergence of multimedia technology.

**UNIT I Introduction (9)**

What is mean by Animation – Why we need Animation – History of Animation– Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects -Creating Animation.

**UNIT II Creating Animation in Flash (9)**

Introduction to Flash Animation – Introduction to Flash – Working with the Timeline and Frame-based Animation - Working with the Timeline and Tween-based Animation – Understanding Layers - Action script.

**UNIT III 3D Animation & its Concepts (9)**

Types of 3D Animation – Skeleton & Kinetic 3D Animation – Texturing & Lighting of 3D Animation – 3D Camera Tracking – Applications & Software of 3D Animation.

**UNIT IV Motion Caption (9)**

Formats – Methods – Usages – Expression – Motion Capture Software's – Script Animation Usage – Different Language of Script Animation Among the Software.

**UNIT V Concept Development (9)**

Story Developing – Audio & Video – Color Model – Device Independent Color Model – Gamma and Gamma Correction - Production Budgets- 3D Animated Movies.

**Total Hours: 45**

**TEXT BOOK:**

1. Computer Graphics, Multimedia and Animation-Malay K. Pakhira, PHI Learning PVT Ltd, 2010

**REFERENCES:**

1. Principles of Multimedia – Ranjan Parekh, 2007, TMH. (Unit I, Unit V)
2. Multimedia Technologies – Ashok Banerji, Ananda Mohan Ghosh – McGraw Hill Publication.
3. Encyclopedia of Multimedia and Animations-Pankaj Dhaka, Anmol Publications-2011

Introduction – system configuration – pre installation planning – Installation practice – routine checks – PC Assembling and integration – BIOS setup – Engineering versions and compatibility – preventive maintenance – DOS – Virus – Data Recovery.

## **UNIT V      Troubleshooting**

**(9)**

Introduction – computer faults – Nature of faults – Types of faults – Diagnostic programs and tools – Microprocessor and Firmware – Programmable LSI's – Bus Faults – Faults Elimination process – Systematic Troubleshooting – Symptoms observation and analysis – fault diagnosis – fault rectification – Troubleshooting levels – FDD, HDD, CD ROM Problems.

**Total Hours: 45**

### **TEXT BOOK:**

1. B. Govindarajalu, "IBM PC Clones Hardware, Troubleshooting and Maintenance", 2/E, TMH, 2002.

### **REFERENCES:**

1. Peter Abel, NiyazNizamuddin, "IMB PC Assembly Language and Programming", Pearson Education, 2007
2. Scott Mueller, "Repairing PC's", PHI, 1992

**COURSE OBJECTIVES:**

- To understand Object Oriented Programming concepts and basic characteristics of Java
- To know the principles of packages, inheritance and interfaces
- To define exceptions and use I/O streams
- To develop a java application with threads, generics classes and swings
- To explain the need for generic programming
- To design and build simple Graphical User Interfaces

**COURSE OUTCOMES:**

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

- Develop Java programs using OOP principles
- Develop Java programs with the concepts inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Develop Java applications with threads and generics classes and swings
- Understand various aspects for motivation of generic programming
- Develop various interactive Java programs using OOP concepts of Java

**UNIT I INTRODUCTION TO JAVA (9)**

Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – abstract classes – polymorphism.- Objects and classes in Java – defining classes – methods - access specifiers – static members – constructors – finalize method

**UNIT II PACKAGES (9)**

Arrays – Strings - Packages – Java-Doc comments -- Inheritance – class hierarchy –polymorphism – dynamic binding – final keyword – abstract classes

**UNIT III I/O STREAMS (9)**

The Object class – Reflection – interfaces – object cloning – inner classes – proxies - I/O Streams - Graphics programming – Frame – Components – working with 2D shapes.

**UNIT IV EXCEPTION HANDLING (9)**

Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy – introduction to Swing – Model-View-Controller design pattern –buttons – layout management – Swing Components – exception handling – exception hierarchy – throwing and catching exceptions.

**UNIT V MOTIVATION FOR GENERIC PROGRAMMING (9)**

Motivation for generic programming – generic classes – generic methods – generic code and virtual machine – inheritance and generics – reflection and generics - Multi-threaded programming – interrupting threads – thread

states – thread properties – thread synchronization – Executors – synchronizers.

### **TEXT BOOK:**

1. Cay S. Horstmann and Gary Cornell Core Java: Volume I–Fundamentals Sun Microsystems Press 2008

### **REFERENCES:**

1. K. Arnold and J. Gosling The JAVA programming language Third edition, Pearson Education, 2009
2. Timothy Budd Understanding Object-oriented programming with Java Updated Edition, Pearson Education 2002
3. C. Thomas Wu An introduction to Object-oriented programming with Java Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2008

### **WEBSITES:**

1. [http://elvis.rowan.edu/~kay/cpp/vc6\\_tutorial/](http://elvis.rowan.edu/~kay/cpp/vc6_tutorial/)
2. <http://www.winprog.org/tutorial/msvc.html>
3. <http://www.tutorialized.com/tutorials/Visual-C/1>
4. <http://www.freeprogrammingresources.com/visualcpp.html>

## **LIST OF OPEN ELECTIVES**

### **LIST OF OPEN ELECTIVES OFFERED BY OTHER DEPARTMENTS**

#### **SCIENCE AND HUMANITIES**

**17BESHOE01**

**PROBABILITY ANDRANDOMPROCESS**

**L T P C 3 0 0 3**

#### **Course Objectives**

- To enable students to attain fluency and accuracy to inculcate proficiency in professional communication to meet the growing demand in the field of Global communication.
- To help students acquire their ability to speak effectively in real life situations.
- To inculcate the habit of reading and to develop their effective reading skills.
- To ensure that students use dictionary to improve their active and passive vocabulary.
- To enable students to improve their lexical, grammatical and communicative competence.
- To study statistical methods of the sample data.

#### **Course Outcomes**

1. To use English language for communication: verbal & non-verbal.
2. To enrich comprehension and acquisition of speaking & writing ability.
3. To inculcate the habit of reading and to develop their effective reading skills.
4. To hone their listening, speaking, Reading and writing skills.
5. To gain confidence in using English language in real life situations.
6. To improve word power: lexical, grammatical and communication competence.

#### **UNIT-I MEASURES OF CENTRAL TENDENCYANDPROBABILITY**

**9**

Measures of central tendency – Mean, Median, Mode - Standard Deviation

Probability - Random variable - Axioms of probability - Conditional probability - Total probability – Baye's theorem.



**UNIT-II STANDARD DISTRIBUTIONS****9**

Functions of a random variable - Binomial, Poisson, Uniform, Exponential, Gamma(one Parameter only) and Normal distributions - Moment generating functions, Characteristic function and their properties – Chebyshev's inequality.

**UNIT-III TWO DIMENSIONAL RANDOM VARIABLES****9**

Joint distributions - Marginal and conditional distributions - Probability mass function - Probability density functions – Covariance - Correlation and regression

**UNIT-IV CLASSIFICATION OF RANDOM PROCESS****9**

Definition and examples - first order, second order, strictly stationary, wide – sense stationary and Ergodic processes - Markov process - Binomial, Poisson and Normal processes - Sine wave process.

**UNIT-V CORRELATION AND SPECTRAL DENSITIES****9**

Auto correlation - Cross correlation - Properties – Power spectral density – Cross spectral density - Properties – Wiener-Khinchine relation – Relationship between cross power spectrum and cross correlation function - Linear time invariant system - System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output.

**TOTAL : 45 HOURS****TEXT BOOK**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Peebles Jr, P.Z	Probability Random Variables and Random Signal Principles	Tata McGraw-Hill Publishers, New Delhi.	2002

**REFERENCES**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Ross, S	A first Course in Probability	Pearson Education, New Delhi (Chap 2 to 8)	2012

2	Gupta, S.C. and Kapoor, V.K	Fundamentals of Mathematical Statistics	Sultan Chand and Sons, New Delhi.	2014
3	Veerarajan,T.	Probability, Statistics and Random process	Tata McGraw-Hill Education pvt. Ltd., New Delhi	2008
4	Henry Stark and John W. Woods	Probability and Random Processes with Applications to Signal Processing	Pearson Education, Third edition, Delhi	2002

## WEBSITES

1. [www.cut-the-knot.org/probability.shtml](http://www.cut-the-knot.org/probability.shtml)
2. [www.mathcentre.ac.uk](http://www.mathcentre.ac.uk)
3. [www.mathworld.Wolfram.com](http://www.mathworld.Wolfram.com)

**Course Objectives**

- Be able to understand basic knowledge of fuzzy sets and fuzzy logic
- Be able to apply basic knowledge of fuzzy operations.
- To know the basic definitions of fuzzy relations
- Be able to apply basic fuzzy inference and approximate reasoning
- To know the applications of fuzzy Technology.
- To study and acquire the knowledge to comprehend the concepts of fuzzy relations

**Course Outcomes**

1. To gain the main subject of fuzzy sets.
2. To understand the concept of fuzziness involved in various systems and fuzzy set theory.
3. To gain the methods of fuzzy logic.
4. To comprehend the concepts of fuzzy relations.
5. To analyze the application of fuzzy logic control to real time systems.
6. The Engineers will have an exposure on various topics such as fuzzy algebra, fuzzy theory and fuzzy technology.

**UNIT I FUZZYSETS 9**

Fuzzy Sets : Basics Classical sets vs Fuzzy Sets – Need for fuzzy sets – Definition and Mathematical representations – Level Sets – Fuzzy functions - Zadeh's Extension Principle

**UNIT II OPERATIONS ON FUZZYSETS 9**

Operations on Fuzzy Sets Operations on  $[0,1]$  – Fuzzy negation, triangular norms, tconorms, fuzzy implications, Aggregation Operations, Fuzzy Functional Equations

**UNIT III FUZZYRELATIONS 9**

Fuzzy Relations Fuzzy Binary and n-ary relations – composition of fuzzy relations – Fuzzy Equivalence Relations – Fuzzy Compatibility Relations – Fuzzy Relational Equations

**UNIT IV FUZZYMEASURES 9**

Possibility Theory Fuzzy Measures – Evidence Theory – Necessity and Belief Measures – Probability Measures vs Possibility Measures

Approximate Reasoning Fuzzy Decision Making - Fuzzy Relational Inference – Compositional rule of Inference - Efficiency of Inference - Hierarchical

**TOTAL : 45 HOURS**

**TEXT BOOK**

<b>S. NO.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	George J Klir and Bo Yuan	Fuzzy Sets and Fuzzy Logic : Theory and Applications	Prentice Hall of India, New Delhi.	2003

**REFERENCES**

<b>S. NO.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	Zimmermann H.J.	Fuzzy Set Theory and its Applications	Kluwer Academic publishers, USA.	2001
2	Michal Baczynski and Balasubramaniam Jayaram	Fuzzy Implications	Springer-Verlag publishers, Heidelberg	2008
3	Kevin M Passino and Stephen Yurkovich	Fuzzy Control	Addison Wesley Longman publishers, USA	1998

**WEBSITES**

1. [www.mathcentre.ac.uk](http://www.mathcentre.ac.uk)
2. [www.mathworld.Wolfram.com](http://www.mathworld.Wolfram.com)
3. [www.calvin.edu/~pribeiro/othrlnks/Fuzzy/fuzzysets.htm](http://www.calvin.edu/~pribeiro/othrlnks/Fuzzy/fuzzysets.htm)



**UNIT V INNERPRODUCT SPACES****9**

The Dot Product on  $\mathbb{R}^n$  and Inner Product Spaces - Orthonormal Bases - Orthogonal Complements - Application : Least Squares Approximation - Diagonalization of Symmetric M - Application: Quadratic Forms

**TOTAL : 45 HOURS****TEXT BOOKS**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Kreyszig,E	Advanced Engineering Mathematics	John Wiley & Sons, New Delhi.	2014
2	ShahnazBathul	Text book of Engineering Mathematics(Special Functions and ComplexVariables)	PHI Publications, New Delhi.	2009

**REFERENCES**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Kreyszig,E	Advanced Engineering Mathematics	John Wiley & Sons, New Delhi.	2014
2	Anton and Rorres	Elementary Linear Algebra, Applications version	Wiley India Edition, New Delhi.	2012
3	Jim Defranza, Daniel Gagliardi	Introduction to Linear Algebra with Application	Tata McGraw-Hill, New Delhi.	2008

**WEBSITES**

1. [www.sosmath.com](http://www.sosmath.com)
2. [www.nptel.ac.in](http://www.nptel.ac.in)
3. [www.mathworld.wolfram.com](http://www.mathworld.wolfram.com)

**Course Objectives**

- To disseminate the fundamentals of acoustic waves.
- To inculcate the characteristics of radiation and reception of acoustic waves.
- To divulge knowledge on the basics of pipe resonators and filters.
- To introduce the features of architectural acoustics.
- To impart the basic knowledge of transducers and receivers
- To study about the pipes resonants and filters

**Course Outcomes**

1. Develop the idea of the fundamentals of acoustic waves.
2. Apply the concepts of radiation and reception of acoustic waves.
3. Explain the basic ideas of pipe resonators and filters.
4. Illustrate the basics of architectural acoustics.
5. Illustrate the transducers and receivers and its applications in various electronic devices.
6. Apply the knowledge inputs of the course for engineering applications.

<b>UNIT I</b>	<b>INTRODUCTION</b>	<b>9</b>
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Acoustics waves – Linear wave equation – sound in fluids – Harmonic plane waves - Acoustics intensity – Specific acoustic impedance – spherical waves – Describer scales. Reflection and Transmission: Transmission from one fluid to another normal and oblique incidence –method of images.

<b>UNIT II</b>	<b>RADIATION AND RECEPTION OF ACOUSTIC WAVES</b>	<b>9</b>
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Radiation from a pulsating sphere – Acoustic reciprocity – continuous line source radiation impedance - Fundamental properties of transducers. Absorption and attenuation of sound. Absorption from viscosity – complex sound speed and absorption – classical absorption coefficient

<b>UNIT III</b>	<b>PIPES RESONATORS AND FILTERS</b>	<b>9</b>
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Resonance in pipes - standing wave pattern absorption of sound in pipes – long wavelength limit – Helmholtz resonator - acoustic impedance - reflection and transmission of waves in pipe - acoustic filters – low pass, high pass and band pass. Noise, Signal detection, Hearing and speech. Noise, spectrum level and band level – combining band levels and tones – detecting signals in noise – fundamental properties of hearing – loudness level and loudness – pitch and frequency –voice.

**UNIT IV ARCHITECTURAL ACOUSTICS****9**

Sound in enclosure – A simple model for the growth of sound in a room – reverberation time - Sabine, sound absorption materials – measurement of the acoustic output of sound sources in live rooms – acoustics factor in architectural design. Environmental Acoustics: Highway noise – noise induced hearing loss – noise and architectural design specification and measurement of some isolation design options.

**UNIT V TRANSDUCTION****9**

Transducer as an electrical network – canonical equation for the two simple transducers transmitters – moving coil loud speaker– horn loud speaker, receivers – condenser – microphone – moving coil electrodynamic microphone piezoelectric microphone – calibration of receivers

**TOTAL : 45 HOURS****TEXTBOOK**

S.NO	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Lawrence E. Kinsler, Austin R. Frey,	Fundamentals of Acoustics	John Wiley & Sons	2000

**REFERENCE**

S.NO	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	<u>F. Alton Everest</u>	Master Handbook of Acoustics	McGraw Hill Professional	2014

**WEBSITES**

1. [www.acousticalsociety.org](http://www.acousticalsociety.org)
2. [www.acoustics-engineering.com](http://www.acoustics-engineering.com)
3. [www.nptel.ac.in](http://www.nptel.ac.in)
4. [www.ocw.mit.edu](http://www.ocw.mit.edu)



**Course Objectives**

- To make the students conversant with basics of Solid wastes and its classification.
- To make the student acquire sound knowledge of different treatments of solid wastes.
- To acquaint the student with concepts of waste disposals.
- To develop an understanding of the basic concepts of Hazardous waste managements.
- To acquaint the students with the basics of energy generation from waste materials.
- To understand about the solidwaste

**Course Outcomes:**

- Outline the basic principles of Solid waste and separation of wastes (K).
- Identify the concepts of treatment of solid wastes (S).
- Identify the methods of wastes disposals. (S)
- Examine the level of Hazardousness and its management. (S)
- Examine the possible of the energy production using waste materials. (S)
- Integrate the chemical principles in the projects undertaken in field of engineering and technology (A).

<b>UNIT I</b>	<b>SOLIDWASTE</b>	<b>9</b>
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Definitions – Sources, Types, Compositions, Properties of Solid Waste – Municipal Solid Waste – Physical, Chemical and Biological Property – Collection – Transfer Stations – Waste Minimization and Recycling of Municipal Waste

<b>UNIT II</b>	<b>WASTE TREATMENT</b>	<b>9</b>
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Size Reduction – Aerobic Composting – Incineration – batch type and continuous flow type, Medical/ Pharmaceutical Waste Incineration – Environmental Impacts – Measures of Mitigate Environmental Effects due to Incineration

<b>UNIT III</b>	<b>WASTE DISPOSAL</b>	<b>9</b>
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Sanitary Land Fill Method of Solid Waste Disposal – Land Fill Classification, Types, Methods & Siting Consideration – Layout & Preliminary Design of Land Fills – Composition, Characteristics generation, Movement and Control of Landfill Leachate & Gases – Environmental Monitoring System for Land Fill Gases, Waste landfill Remediation

<b>UNIT IV</b>	<b>HAZARDOUSWASTE MANAGEMENT</b>	<b>9</b>
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Definition & Identification of Hazardous Waste – Sources and Nature of Hazardous Waste – Impact on Environment – Hazardous Waste Control – Minimization and Recycling -Assessment of Hazardous Waste

Sites – Disposal of Hazardous Waste, Underground Storage Tanks Construction, Installation & Closure, Remediation, risk assessment.

## UNITV ENERGY GENERATIONFROMWASTE

9

Thermal conversion Technologies – Pyrolysis systems, Combustion systems, Gasification systems, Environment control systems, Energy recovery systems. Biological & Chemical conversion technologies – Aerobic composting, low solids. Anaerobic digestion, high solids anaerobic digestion, Energy production from biological conversion products, other biological transformation processes. Chemical transformation processes.

**TOTAL : 45 HOURS**

### TEXT BOOK

S.NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Dara.S.S,Mishra.D.D	A Text book of Environmental Chemistry and Pollution Control	S.Chand and Company Ltd., New Delhi.	2011

### REFERENCE BOOKS

S.NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Naomi B. Klinghoffer and Marco J. Castaldi	Waste to Energy Conversion Technology (Woodhead Publishing Series in Energy)	Woodhead Publishing Ltd., Cambridge, UK	2013
2.	<u>Frank Kreith,</u> <u>George Tchobanoglous</u>	Hand Book of Solid Waste Management- 2 <sup>nd</sup> edition	McGraw Hill Publishing Ltd., Newyork	2002
3.	Shah, L Kanti	Basics of Solid & Hazardous Waste Management Technology	Prentice Hall (P) Ltd., New Delhi.	1999

### WEBSITES

1. [www.iitk.ac.in/3inetwork/html/reports/IIR2006/Solid\\_Waste](http://www.iitk.ac.in/3inetwork/html/reports/IIR2006/Solid_Waste).
2. <http://www.unep.or.jp/ietc/ESTdir/Pub/MSW/>
3. [www.alternative-energy-news.info/technology/garbage-energy/](http://www.alternative-energy-news.info/technology/garbage-energy/)
4. [nzic.org.nz/ChemProcesses/environment/](http://nzic.org.nz/ChemProcesses/environment/)

**Course Objectives**

1. To make the students conversant about the green chemistry
2. To make the student acquire sound knowledge of the atom efficient process and synthesis elaborately.
3. To acquaint the student with concepts of green technology.
4. To develop an understanding of the basic concepts of renewable energy resources.
5. To acquaint the students with the basic's information on catalysis.
6. To gain knowledge on the green technology and renewable energyresources

**Course Outcomes**

1. Outline the basic principles of green chemistry (K).
2. Examine the different atom efficient process and synthesis elaborately (S).
3. Apply the concepts combustion of green technology (S).
4. Identify and apply the concepts of renewable energy (S).
5. Apply the concepts of green catalysts in the synthesis (S).
6. Integrate the chemical principles in the projects undertaken in field of engineering and technology (A)

**UNIT I INTRODUCTION TO GREENCHEMICALPRINCIPLES****9**

Definition, tools, and twelve principles of green chemistry, solvent-less reactions and reactions in water, microwaves and fluoros solvents, green resolution of racemic mixtures, materials for a sustainable economy, chemistry of longer wear, agrochemicals: problems and green alternate solutions.

**UNIT II ATOMEFFICIENT PROCESSES****9**

Atom efficient processes, evaluating chemical reagents according to their yield and atom efficiency, examples of efficient stoichiometric and catalytic processes, atom economy and homogeneous catalysis, halide-free synthesis and alternatives to Strecker synthesis.

**UNIT III BIOTECHNOLOGY ANDGREENCHEMISTRY****9**

Bio technology and its applications in environmental protection-Bio informatics-Bio remediation, biological purification of contaminated air.Green chemistry for clean technology-Significance of green chemistry-Basic components of green chemistry, Industrial applications of green chemistry, green fuels-e-green propellants and bio catalysts.

**UNIT IVRENEWABLE RESOURCES****9**

Use of renewable materials, evaluating feedstock and starting materials and their origins, toxicity, sustainability and the downstream implications of the choice of feedstock, commodity chemicals from glucose and biomass conversion.

**UNIT V CATALYSIS IN GREEN CHEMISTRY****9**

Catalysis, energy requirements and usage, optimization of the reaction by minimizing the energy requirements, examples of efficient catalytic reactions including the use of heterogeneous catalysis, zeolites, oxidation using molecular oxygen.

**TOTAL : 45 HOURS****TEXT BOOKS**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Sanjay K. Sharma, Ackmez Mudhoo	Green Chemistry for Environmental Sustainability	CRC Press , London	2010
2.	Ahluwalia V. K. and M. Kidwai	New Trends in Green Chemistry 2 <sup>nd</sup> edition	Anamaya publishers., New Delhi.	2007

**REFERENCE BOOKS**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Dr. Sunita Ratan	A Textbook of Engineering Chemistry	S.K. Kataria and Sons., New Delhi.	2012
2.	Mukesh Doble. Ken Rollins, Anil Kumar	Green Chemistry and Engineering, 1 <sup>st</sup> edition	Academic Press, Elsevier., New Delhi.	2007
3.	Desai K. R.	Green Chemistry	Himalaya Publishing House, Mumbai.	2005
4.	Matlack A. S.	Introduction to Green Chemistry	Marcel Dekker: New York	2001

**WEBSITES**

1. <http://www.organic-chemistry.org/topics/green-chemistry.shtm>
2. <http://www.essentialchemicalindustry.org/processes/green-chemistry.html>
3. [http://www.chm.bris.ac.uk/webprojects2004/vickery/green\\_solvents.htm](http://www.chm.bris.ac.uk/webprojects2004/vickery/green_solvents.htm)
4. <http://www.epa.gov/research/greenchemistry/>
5. <http://www.amazon.in/Green-Chemistry-Catalysis>

**Course Objectives**

- To get the information on electrochemical material.
- To study about the conducting polymers.
- To acquaint the student with concepts of Energy storage devices.
- To gain knowledge on the batteries and power sources.
- To develop energy storage devices.
- To study and Identify the concepts of storage devices and its applications. (S)

**Course Outcomes**

1. Outline the basic principles of chemistry in **electrochemical material (K)**.
2. Examine the properties of conducting polymers (S).
3. Apply the concepts of electrochemistry in storage devices. (S)
4. Identify the concepts of storage devices and its applications. (S)
5. Apply the suitable materials for the manufacturing of storage devices. (S)
6. Integrate the chemical principles in the projects undertaken in field of engineering and technology (A)

**UNIT I METALFINISHING****9**

Fundamental principles, surface preparation-Electroplating of copper, nickel, chromium, zinc and precious metals (gold & silver)- Electroplating for electronic industry- Alloy plating, brass plating- Electro less plating of nickel- anodizing – Electroforming – Electro winning.

**UNIT II CONDUCTING POLYMERS AND ELECTROCHEMICALS****9**

Electropolymerisation- anodic and cathodic polymerization-effect of reaction parameters on the course of the reaction- Electrochemical preparation of conducting polymers- poly acetylene- Electrolytic production of perchlorates and manganese dioxide- Electro organic chemicals- constant current electrolysis.

**UNIT III BATTERIES AND POWER SOURCES-I****9**

Principles of energy conservation- electrochemical energy conservation- thermodynamic reversibility, Gibbs equation. EMF- battery terminology, energy and power density- Properties of anodes, cathodes, electrolytes and separators- Types of electrolytes.

Primary batteries- Dry Leclanche cells, alkaline primary batteries, Lithium batteries, Lithium ion batteries- construction, characteristics, problems associated with system- Secondary batteries- Lead acid, nickel cadmium- Fuel cells- Introduction, types of fuel cells, advantages.

**UNIT V ELECTROCHEMICAL MATERIAL SCIENCE****9**

Solar cells- Preparation of CdS/Cu<sub>2</sub>S solar cells by screen printing techniques and their characteristics - Amorphous silicon solar cells - Photo electrochemical cells(PEC) for conversion of light energy to electrical energy - PEC cells based on Cd/Se and Ga/As characteristics.

**TOTAL : 45 HOURS****TEXT BOOKS**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Cynthia G. Zoski	Hand Book of Electrochemistry	Academic Press, Elsevier.,UK	2007
2.	D.Pletcher and F.C.Walsh	Industrial Electrochemistry	Chapman and Hall, London	1990

**REFERENCE BOOKS**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	M. Barak	Electrochemical Power Sources	I.EEE series, Peter Peregrinus Ltd, Steverage, U.K.	1997
2.	Bruno Scrosati	Applications of Electroactive Polymers	Chapman & Hall, London	1993
3.	K.L. Chopra and I. Kaur	Thin Film Devices and their Application	Plenum Press, New York.	1983
4.	M.M.Baizer	Organic Electrochemistry	Dekker Inc. New York	1983

**WEBSITES**

1. <http://www.anoplate.com/finishes/>
2. <http://hyperphysics.phy-astr.gsu.edu/hbase/electric/battery.html>
3. [http://inventors.about.com/od/sstartinventions/a/solar\\_cell.htm](http://inventors.about.com/od/sstartinventions/a/solar_cell.htm)

**Course Objectives**

1. To make the students conversant with **cement and lime** and its uses.
2. To make the student acquire sound knowledge of abrasives and refractories.
3. To acquaint the student with concepts of inorganic chemicals.
4. To develop an understanding of the basic concepts **explosives**.
5. To acquaint the students with the basics of **agriculture chemicals**.
6. To study the concepts of explosives and smoke screens(S)

**Course Outcomes**

1. Outline the basic chemistry of **cement and lime (K)**.
2. Examine the uses of abrasives and refractories (S).
3. Identify the usage of the inorganic chemicals. (S)
4. Identify the concepts of explosives and smoke screens (S).
5. Identify the usage of the **agriculture** chemicals (S).
6. Integrate the chemical principles in the projects undertaken in field of engineering and technology (A).

**UNIT I CEMENTANDLIME****9**

Manufacture of Portland cement – setting and hardening of portland cement – regauging cement – effect of fineness on setting and hardening – freezing – high early strength cement – high alumina cement Lime – raw materials- manufacture – slaking – lime mortar – types of lime – high – calcium or fat lime – calcium lime or lean lime – magnesium lime – dolomitic lime – hydraulic lime.

**UNIT II ABRASIVESANDREFRACTORIES****9**

Abrasives – hard abrasives – siliceous abrasives – soft abrasives – artificial abrasives – uses. Refractories – definition – classification – acid refractories – basic refractories – neutral refractories – properties –uses.

**UNIT IIIINORGANICCHEMICALS****9**

Common salt and soda ash – manufacture – different grades – products – alkalis –  $\text{Na}_2\text{CO}_3$ , caustic soda and chlor-alkali industry – manufacture principles of electrolytic process – chlorine – storage. Hydrochloric acid – manufacture – absorption – uses, sulphur and sulphuric acid – extraction of sulphur – manufacture of  $\text{H}_2\text{SO}_4$  – chamber – contact processes – industrialuses.

**UNIT V EXPLOSIVES****9**

Explosives – uses – properties and tests – explosives for war – nitrocellulose – picric acid and T.N.T. – industrial explosives – nitroglycerin and dynamites – black powder – smoke screens – incendiaries – gas mask.

**UNIT VI AGRICULTURE CHEMICALS****9**

Fertilizers – organic and inorganic – ammoniated superphosphates, sodium nitrate, solid pellets – potassium salts – pesticides – fungicides – herbicides – their preparations and characteristics – environmental impacts.

**TOTAL : 45 HOURS****TEXT BOOKS**

<b>S. NO.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1.	Harikrishan	Industrial Chemistry	Goel Publishing House, Meerut.	2014
2.	B.K. Sharma	Industrial Chemistry	Goel Publishing House, Meerut.	2000

**REFERENCE BOOKS**

<b>S. NO.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1.	B.N.Chakrabarty	Industrial Chemistry	Oxford and IBH Publishing CO. New Delhi.	1998
2.	James A. Kent	Hand Book of Industrial Chemistry, 9 <sup>th</sup> edition	Van Nostrand Reinhold, New York.	1992
3.	R.N. Sherve	Chemical Process Industries	McGraw-Hill, Kugakuisha Ltd., Tokyo.	1984
4.	S.D. Shukla and G.N. Pandey	A Text book of Chemical Technology	Vikas Publishing House (P) Ltd, New Delhi.	1979

**WEBSITES**

1. <http://en.wikipedia.org/wiki/Cement>
2. <http://www.hon.ch/HONselect/Selection/D01.html>
3. <http://fas.org/man/dod-101/navy/docs/fun/part12.htm>
4. <http://toxics.usgs.gov/topics/agchemicals.html>



**PURPOSE:**

It provides techniques of writing and also trains the students to write without their influence of mother tongue. In addition to honing their skills as professional writers, students will develop technical vocabularies that will aid writing research articles and discussing articles produces by their peers.

**Course Objective:**

1. Develop abilities to write technically and expressively.
2. Recognize writing as a constructive, meaningful process.
3. Practice using reading strategies for effective writing.
4. Design effective technical documents for both print and digital media.
5. Identify the qualities of good technical writing.
6. To study the reading ability for effective writing.

**Course Outcomes:**

Students undergoing this course are able to

1. Construct simple sentences, correct common grammatical errors in written English.
2. Develop confidence in English language by imbibing lexical and syntax rules.
3. Enrich their reading ability for effective writing.
4. Elevate them to minimize word, sentence, and paragraph length without sacrificing clarity or substance
5. Familiarize with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation.
6. Demonstrate the basic components of definitions, descriptions, process explanations, and other common forms of technical writing.

**UNIT I      BASICS OF WRITING**

Introduction to Technical Writing – Importance of Writing – Characteristics of Writing– Audience Recognition/ Analysis – Appropriateness of language — Conciseness and Flow– Bias free and plain writing – Impersonal and Formal Language -Techniques of Technical Writing– Overcoming writer’s block  
– Prioritizing for effective writing– Avoiding plagiarism.

**UNIT II      PARAGRAPHS AND ESSAYS**

Expressing Ideas – Paragraph construction – Cohesion and Coherence – Adequate development – Kinds of paragraphs – Writing drafts – Paragraph length and pattern – Types of Essays – Characteristics of Essays – Salient point of sentence constructions.

### **UNIT III        LETTERS, MEMOS AND EMAIL**

Formal written correspondence – Types of messages – Business letters – Structure of letters – Language in letters – Tense in letters – Cover letters – Resumes – Curriculum vitae – Memos – Emails – Email Etiquette – Effectiveness and purpose.

### **UNIT IV THE ART OF CONDENSATION AND TECHNICAL PROPOSALS**

Steps to Effective précis writing – Guidelines – Technical Proposals – Types of Proposals – Characteristics – Body of the Proposals – Style and appearance – Evaluation of proposals – Proof Reading – Book /Film Review – Travelogue – Dialogue Writing.

### **UNIT V        REPORTS AND RESEARCH ARTICLES**

Discussion of newspaper articles -Objectives of Reports – Characteristics of Reports – Structure of Reports – Types of Reports – Writing an article – Writing research articles – Essential features of Dissertation – Organizing the structure of thesis and articles – Writing technical description.

#### **TEXT BOOKS:**

<b>S.NO</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	Article IX. <u>V.N. Arora &amp; Lakshmi Chandra</u>	Article X. Improve Your Writing: Revised First Edition	OUP	2014

#### **REFERENCES:**

<b>S.NO</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	Crème, P. and M. Lea.	Writing at University: A guide for students.	OUP	2003
2	Graham King	Collins Improve Your Writing	Collins; First edition	2009
3	David Morley	The Cambridge Intro. To Creative Writing	Cambridge	2008

#### **WEBSITES:**

1. <http://www.stevepavlina.com/blog/2006/08/10-ways-to-improve-your-technical-skills/>
2. <http://www.nyu.edu/classes/keefe/brain/net2.html>
3. <https://www.udemy.com/technical-writing-and-editing/>
4. <http://techwhirl.com/what-is-technical-writing>

**COURSE OBJECTIVES:**

- To study concepts of Internet, IP addresses and protocols
- To explain the concept of web page development through HTML
- To introduce the PERL and explore its current strengths and Weaknesses
- To write working Java code to demonstrate the use of applets for client-side programming
- To study Internet telephony and various multimedia applications
- To Elaborate on the principles of web page development

**COURSE OUTCOMES:**

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

- Learn the advanced concepts & techniques of Internet and Java.
- Analyze the requirements for and create and implement the principles of web page development
- Understand the concepts of PERL
- Implement client-side programming using java applets
- Generate internet telephony based upon advanced concepts
- Develop applications on internet programming based on java applets and scripts

**UNIT I INTRODUCTION****9**

Introduction - Network of Networks, Intranet, Extranet and Internet. World Wide Web- Domain and Sub domain, Address Resolution, DNS, Telnet, FTP, HTTP. TCP/IP- Features, Segment, Three-Way Handshaking, Flow Control, Error Control, Congestion control, IP Datagram, IPv4 and IPv6. IP Subnetting and addressing- Classful and Classless Addressing, Subnetting

**UNIT II HTML****9**

Introduction, Editors, Elements, Attributes, Heading, Paragraph. Formatting, Link, Head, Table, List, Block, Layout, CSS. Form, Iframe, Colors, Colorname, Colorvalue. Image Maps- map, area, attributes of image area- Extensible Markup Language (XML)- Introduction, Tree, Syntax, Elements, Attributes, Validation, Viewing. XHTML in brief. CGI Scripts- Introduction- Environment Variable, GET and POST Methods.

**UNIT III PERL****9**

Introduction, Variable, Condition, Loop, Array, Implementing data structure, Hash, String, Regular Expression, File handling, I/O handling- JavaScript- Basics, Statements, comments, variable, comparison, condition, switch, loop, break. Object – string, array, Boolean, reg-ex. Function, Errors, Validation. Cookies- Definition of cookies, Create and Store a cookie with example. Java Applets- Container Class, Components, Applet Life Cycle, Update method, Applications.

**UNIT IV CLIENT-SERVER PROGRAMMING****9**

Client-Server programming In Java - Java Socket, Java RMI. Threats - Malicious code-viruses, Trojan horses, worms; eavesdropping, spoofing, modification, denial of service attacks- Network security techniques- Password and Authentication- VPN, IP Security, security in electronic transaction, Secure Socket Layer (SSL), Secure Shell (SSH). Firewall- Introduction, Packet filtering, Stateful, Application layer, Proxy.

**UNIT V INTERNET TELEPHONY****9**

Introduction, VoIP- Multimedia Applications- Multimedia over IP: RSVP, RTP, RTCP and RTSP- Streaming media, Codec and Plugins, IPTV- Search Engine and Web Crawler- Definition, Meta data, Web Crawler, Indexing, Page rank, overview of SEO.

**TOTAL: 45 HOURS****TEXT BOOKS**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Paul Deitel, Harvey Deitel and Abby Deitel	Internet and World Wide Web-How to Program	5th Edition	2011
2	N.P. Gopalan and J. Akilandeswari	Web Technology: A Developer's Perspective	PHI Learning, Delhi	2013

**REFERENCES**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Rahul Banerjee	Internetworking Technologies, An Engineering Perspective	PHI Learning, Delhi	2011
2	Robert W. Sebesta	Programming the World Wide Web	Pearson Education	2016

**P C 3 0 0 3****COURSE OBJECTIVES:**

- To impart the fundamental concepts of Computer Animation and Multimedia
- To study the graphic techniques and algorithms using flash
- Explain various concepts available in 3D animation
- Explain various devices available for animation
- To study the multimedia concepts and various I/O technologies for concept development
- To understand the three-dimensional graphics and their transformations

**COURSE OUTCOMES**

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

- Develop their creativity using animation and multimedia
- Understand the concepts of Flash and able to develop animation using it
- Understand about various latest interactive 3D animation concepts
- Know the various devices and software available in motion capture
- Understand the concept development process
- Develop an interactive multimedia presentation by using multimedia devices and identify theoretical and practical aspects in designing multimedia applications surrounding the emergence of multimedia technology.

**UNIT I INTRODUCTION****9**

What is mean by Animation – Why we need Animation – History of Animation– Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects -Creating Animation.

**UNIT II CREATING ANIMATION IN FLASH****9**

Introduction to Flash Animation – Introduction to Flash – Working with the Timeline and Frame- based Animation - Working with the Timeline and Tween-based Animation – Understanding Layers  
- Actionscript.

**UNIT III 3D ANIMATION & ITS CONCEPTS****9**

Types of 3D Animation – Skeleton & Kinetic 3D Animation – Texturing & Lighting of 3D Animation – 3D Camera Tracking – Applications & Software of 3D Animation.

**UNIT IV MOTION CAPTION****9**

Formats – Methods – Usages – Expression – Motion Capture Software's – Script Animation Usage – Different Language of Script Animation Among the Software.

**UNIT V Concept Development****9**

Story Developing – Audio & Video – Color Model – Device Independent Color Model – Gamma and Gamma Correction - Production Budgets- 3D Animated Movies.

**TOTAL: 45 HOURS**

### TEXT BOOKS

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Malay K. Pakhira	Computer Graphics, Multimedia and Animation	PHI Learning PVT Ltd	2010

### REFERENCES

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Ranjan Parekh	Principles of Multimedia	TMH	2007
2	Ashok Banerji, Ananda Mohan Ghosh	Multimedia Technologies	McGraw Hill Publication	--
3	Pankaj Dhaka	Encyclopedia of Multimedia and Animations	Anmol Publications	2011

**COURSE OBJECTIVES:**

- To study the basic parts of computer in detail
- Introduce various peripheral devices available for computer and its detailed working concepts
- Overview of various interfaces and other hardware overview
- Assemble/setup and upgrade personal computer systems and discuss about power supplies and the skills to trouble-shoot various power-related problems.
- To study basic concepts and methods in troubleshooting
- To study the installation/connection and maintenance of computer and its associated peripherals.

**COURSE OUTCOME:**

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

- Identify the main components for the PC, familiarize themselves with PC memories such as RAM and ROM devices and so on.
- Identify various peripheral devices available and its working
- Understand various concepts of hardware and its interface and control
- Perform basic installation of PC. Importance of maintenance is understood
- Understand Various faults and failures are identified and troubleshooting in detail
- Understand overall PC hardware, interfacing, maintenance and troubleshooting

**UNIT I INTRODUCTION****9**

Introduction - Computer Organization – Number Systems and Codes – Memory – ALU – CU – Instruction prefetch – Interrupts – I/O Techniques – Device Controllers – Error Detection Techniques – Microprocessor – Personal Computer Concepts – Advanced System Concepts – Microcomputer Concepts – OS – Multitasking and Multiprogramming – Virtual Memory – Cache Memory – Modern PC and User.

**UNIT II PERIPHERAL DEVICES****9**

Introduction – Keyboard – CRT Display Monitor – Printer – Magnetic Storage Devices – FDD – HDD – Special Types of Disk Drives – Mouse and Trackball – Modem – Fax-Modem – CD ROM Drive – Scanner – Digital Camera – DVD – Special Peripherals.

**UNIT III PC HARDWARE OVERVIEW****9**

Introduction – Hardware BIOS DOS Interaction – The PC family – PC hardware – Inside the System Box – Motherboard Logic – Memory Space – Peripheral Interfaces and Controllers – Keyboard Interface – CRT Display interface – FDC – HDC.

**UNIT IV INSTALLATION AND PREVENTIVE MAINTENANCE****9**

Introduction – system configuration – pre installation planning – Installation practice – routine checks – PC Assembling and integration – BIOS setup – Engineering versions and compatibility – preventive maintenance – DOS – Virus – Data Recovery.

**UNIT V Troubleshooting****9**

Introduction – computer faults – Nature of faults – Types of faults – Diagnostic programs and tools – Microprocessor and Firmware – Programmable LSI's – Bus Faults – Faults Elimination process – Systematic Troubleshooting – Symptoms observation and analysis – fault diagnosis – fault rectification – Troubleshooting levels – FDD, HDD, CD ROM Problems.

**TOTAL: 45 HOURS****TEXTBOOK**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	B. Govindarajalu	IBM PC Clones Hardware, Troubleshooting and Maintenance	2/E, TMH	2002

**REFERENCES**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Peter Abel, Niyaz Nizamuddin	IMB PC Assembly Language and Programming	Pearson Education	2007
2	Scott Mueller	Repairing PC's	PHI	1992



**COURSE OBJECTIVES:**

- To understand Object Oriented Programming concepts and basic characteristics of Java
- To know the principles of packages, inheritance and interfaces
- To define exceptions and use I/O streams
- To develop a java application with threads, generics classes and swings
- To explain the need for generic programming
- To design and build simple Graphical User Interfaces

**COURSE OUTCOMES:**

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

- Develop Java programs using OOP principles
- Develop Java programs with the concepts of inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Develop Java applications with threads and generics classes and swings
- Understand various aspects for motivation of generic programming
- Develop various interactive Java programs using OOP concepts of Java

**UNIT I INTRODUCTION TO JAVA****9**

Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – abstract classes – polymorphism.- Objects and classes in Java – defining classes – methods - access specifiers – static members – constructors – finalize method

**UNIT II PACKAGES****9**

Arrays – Strings - Packages – Java-Doc comments – Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword – abstract classes

**UNIT III I/O STREAMS****9**

The Object class – Reflection – interfaces – object cloning – inner classes – proxies - I/O Streams - Graphics programming – Frame – Components – working with 2D shapes.

**UNIT IV EXCEPTION HANDLING****9**

Exceptions – Syntax of exception handling code – Multiple catch statements – Using finally statements  
 – Throwing our own exceptions – Using exceptions for debugging

**UNIT V THREADS****9**

Introduction, Creating Threads, The Life Cycle of a Thread, Thread Methods, Using Threads,  
 Synchronization of Threads, Summary

**TOTAL: 45 HOURS****TEXTBOOKS**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Cay S. Horstmann and Gary Cornell	Core Java: Volume I – Fundamentals	Sun Microsystems Press	2008

**REFERENCES**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	K. Arnold and J. Gosling	The JAVA programming language	Third edition, Pearson Education	2009
2	Timothy Budd	Understanding Object-oriented programming with Java Updated Edition	Pearson Education	2002
3	C. Thomas Wu	An introduction to Object-oriented programming with Java Fourth Edition	Tata McGraw-Hill Publishing company Ltd	2008

**WEBSITES**

1. [http://elvis.rowan.edu/~kay/cpp/vc6\\_tutorial/](http://elvis.rowan.edu/~kay/cpp/vc6_tutorial/)
2. <http://www.winprog.org/tutorial/msvc.html>
3. <http://www.tutorialized.com/tutorials/Visual-C/1>
4. <http://www.freeprogrammingresources.com/visualcpp.html>

**Course Objectives**

- To introduce students to the embedded systems, its hardware and software.
- To introduce devices and buses used for embedded networking.
- To study about task management
- To learn about semaphore management
- and message passing
- To study about memory management
- To impart knowledge on task management

**Course Outcomes**

At the end of the course the students will be able to

- Understand overview of embedded systems architecture
- Acquire knowledge on embedded system, its hardware and software.
- Gain knowledge on overview of Operating system
- Discuss about task Management
- Gain knowledge about semaphore management and message passing.
- Gain knowledge about memory management.

**UNIT - I INTRODUCTION TO EMBEDDED SYSTEM****9**

Introduction - Embedded systems description, definition, design considerations & requirements - Overview of Embedded system Architecture (CISC and RISC) - Categories of Embedded Systems - embedded processor selection & tradeoffs - Embedded design life cycle - Product specifications - hardware/software partitioning - iterations and implementation - hardware software integration - product testing techniques – ARM7

**UNIT - II OPERATING SYSTEM OVERVIEW****9**

Introduction – Advantage and Disadvantage of Using RTOS – Multitasking – Tasks - Real Time Kernels – Scheduler - Non-preemptive Kernels - Preemptive Kernels – Reentrancy- Reentrant Functions – Round Robin Scheduling - Task Priorities - Static Priorities – Mutual Exclusion – Deadlock – Intertask Communication – Message Mailboxes – Message Queues - Interrupts - Task Management – Memory Management - Time Management – Clock Ticks.

**UNIT - III TASK MANAGEMENT****9**

Introduction -  $\mu$  C/OS-II Features - Goals of  $\mu$  C/OS-II - Hardware and Software Architecture – Kernel Structures: Tasks – Task States – Task Scheduling – Idle Task – Statistics Task – Interrupts Under  $\mu$  C/OS-II – Clock Tick -  $\mu$  C/OS-II Initialization. Task Management: Creating Tasks – Task Stacks – Stack Checking – Task's Priority – Suspending Task – Resuming Task. Time Management:

Delaying a Task – Resuming a Delayed Task – System Time. Event Control Blocks- Placing a Task in the ECB Wait List – Removing a Task from an ECB waits List.

#### **UNIT - IV SEMAPHORE MANAGEMENT ANDMESSAGEPASSING**

**9**

Semaphore Management: Semaphore Management Overview – Signaling a Semaphore. Message Mailbox Management: Creating a Mailbox – Deleting Mailbox – Waiting for a Message box – Sending Message to a Mailbox- Status of Mailbox. Message Queue Management: Creating Message Queue – Deleting a Message Queue – Waiting for a Message at a Queue – Sending Message to a Queue – Flushing a Queue.

#### **UNIT - VMEMORYMANAGEMENT**

**9**

Memory Management: Memory Control Blocks – Creating Partition- Obtaining a Memory Block – Returning a Memory Block .Getting Started with  $\mu$  C/OS-II – Installing  $\mu$  C/OS-II – Porting  $\mu$  C/OS-II: Development Tools – Directories and Files – Testing a Port - IAR Workbench with  $\mu$  C/OS-II -  $\mu$  C/OS-II Porting on a 8051 CPU – Implementation of Multitasking - Implementation of Scheduling and Rescheduling – Analyze the Multichannel ADC with help of  $\mu$  C/OS-II.

**TOTAL: 45 HOURS**

#### **REFERENCES**

<b>S. NO</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	Jean J. Labrosse	MicroC/OS – II The Real Time Kernel	CMP BOOKS	2009
2	David Seal	ARM Architecture Reference Manual	Addison-Wesley	2008
3	Steve Furbe	ARM System-on-Chip, Architecture	Addison-Wesley Professional California	2000

**Course Objectives**

- To study about various speakers and microphone
- To learn the fundamental of television systems and standards
- To learn the process of audio recording and reproduction
- To study various telephone networks
- To discuss about the working of home appliances
- To familiarize with TV services like ISDN.

**Course Outcomes**

At the end of the course the students will be able to

- Understand working of various type of loud speakers
- Acquire knowledge on various types of picture tubes
- Demonstrate the working of various optical recording systems
- Distinguish various standards for color TV system
- Acquire knowledge on various telecommunication networks
- Demonstrate the working of various home appliances

**UNIT I LOUDSPEAKERS AND MICROPHONES****9**

Dynamic Loudspeaker, Electrostatic loudspeaker, Permanent Magnet Loudspeaker, Woofers and Tweeters - Microphone Characteristics, Carbon Microphones, Dynamic Microphones and Wireless Microphones.

**UNIT – II TELEVISION STANDARDS AND SYSTEMS****9**

Components of a TV system – interlacing – composite video signal. Colour TV – Luminance and Chrominance signal; Monochrome and Colour Picture Tubes - Colour TV systems – NTSC, PAL, SECAM - Components of a Remote Control.

**UNIT – III OPTICAL RECORDING AND REPRODUCTION****9**

Audio Disc – Processing of the Audio signal – read out from the Disc – Reconstruction of the audio signal – Video Disc – Video disc formats- recording systems – Playback Systems.

**UNIT – IV TELECOMMUNICATIONS SYSTEMS****9**

Telephone services - telephone networks – switching system principles – PAPX switching – Circuit, packet and message switching, LAN, MAN and WAN, Integrated Services Digital Network. Wireless Local Loop. VHF/UHF radio systems, Limited range Cordless Phones; cellular modems

**UNIT – V HOME APPLIANCES****9**

Basic principle and block diagram of microwave oven; washing machine hardware and software; components of air conditioning and refrigeration systems.

**TOTAL: 45 HOURS**

## TEXT BOOK

S. NO	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	S.P.Bali	Consumer Electronics	Pearson Education	2005

**Course Objectives**

- To introduce the basic concepts of neural networks and its applications in various domain
- To educate how to use Soft Computing to solve real-world problems
- To have a solid understanding of Basic Neural Network.
- To provide students with a sound and comprehensive understanding of artificial neural networks and machine learning.
- To gain exposure in the field of neural networks and relate the human neural system into the digital world
- To provide knowledge of computation and dynamical systems using neural networks

**Course Outcomes:**

At the end of the course the students will be able to

- Understand the basic concepts of neural networks and its applications in various domains
- Gain knowledge about learning process in Neural Networks
- Apply perception concept in design
- Design using ART phenomena
- Gain knowledge on SOM concepts
- Ability to develop the use of Soft Computing to solve real-world problem

**UNIT I INTRODUCTION TO NEURAL NETWORKS****9**

Introduction - biological neurons and their artificial models - learning, adaptation and neural network's learning rules - types of neural networks- single layer, multiple layer- feed forward, feedback networks

**UNIT II LEARNING PROCESS****9**

Error – correction learning – memory based learning - hebbian learning-competitive learning- Boltzmann learning- supervised and unsupervised learning-adaptation-statistical learning theory.

**UNIT III PERCEPTION****9**

Single layer perception-Adaptive filtering-unconstrained optimization-Least-mean square algorithm- Learning curve-Annealing Technique-perception convergence theorem-Relationship between perception and Baye's classifier-Back propagation algorithm

**UNIT IV ATTRACTOR NEURAL NETWORK AND ART****9**

Hopfield model-BAM model- BAM stability-Adaptive BAM -Lyapunov function-effect of gain-  
Hopfield design-Application to TSP problem-ART- layer 1-layer 2-orienting subsystem- ART  
algorithm-ARTMAP

**UNIT V SELF ORGANIZATION****9**

Self organizing map-SOM Algorithm-properties of the feature map-LVQ-Hierarchical vector  
Quantization. Applications of self-organizing maps: The Neural Phonetic Typewriter Learning  
Ballistic Arm Movements

**TOTAL: 45 HOURS****TEXT BOOKS**

<b>S. NO</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	Simon Haykin	Neural Networks and Learning Machines	3/E - Pearson/ Prentice Hall	2009
2	Satish Kumar	Neural Networks : A Classroom Approach	TMH	2008
3	Freeman J.A., Skapura D.M.	Neural networks, algorithms, applications, and programming techniques	Addison Wesley	2005
4	Laurene Fausett	Fundamentals of Neural Networks: Architectures, Algorithms, and Applications	Pearson/ Prentice Hall	
5	Robert J Schalkoff	Artificial Neural Networks	McGraw Hill	1997



**Course Objectives**

- To introduce the basic concepts of Fuzzy logic and its applications in various domain
- To educate how to use Fuzzy computation to solve real-world problems
- To have a solid understanding of Basic fuzzy models.
- Provide an understanding of the basic mathematical elements of the theory of fuzzy sets.
- To learn about applications on Fuzzy based systems
- To familiarize with fuzzy inference and defuzzy inference procedures

**Course Outcomes:**

At the end of the course the students will be able to

- Understand the basic concepts of Fuzzy logic and its applications in various domain
- Gain knowledge on theory of Reasoning
- Develop fuzzy controllers
- Understand concepts of adaptive fuzzy control
- Analyse the real time application of it

**UNIT– I****9**

Basics Of Fuzzy Logic: Fuzzy sets, Properties of fuzzy sets, operation in fuzzy sets, fuzzy relations, the extension principle

**UNIT– II****9**

Theory Of Approximate Reasoning: Linguistic variables, Fuzzy proportions, Fuzzy if- then statements, inference rules, compositional rule of inference-fuzzy models

**UNIT– III****9**

Fuzzy Knowledge Based Controllers (FKBC): Basic concept structure of FKBC, choice of membership functions, scaling factors, rules, fuzzification and defuzzification procedures – Design of Fuzzy Logic Controller

**UNIT– IV****9**

Adaptive Fuzzy Control: Process performance monitoring, adaption mechanisms, membership functions, tuning using gradient descent and performance criteria. Self organizing controller model based controller.

**UNIT V FUZZY BASED SYSTEMS****9**

Simple applications of FKBC -washing machines- traffic regulations -lift control-fuzzy in medical applications-Introduction to ANFIS.

**TOTAL: 45 HOURS**

## TEXT BOOKS

S. NO	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	D. Diankar, H. Hellendoom and M. Reinfrank	An Introduction to Fuzz y Control	Narosa Publishers India	1996
2	G. J. Klir and T. A. Folger	Fuzzy Sets Uncertainty and Information	PHI IEEE	1995

## **BIO TECHNOLOGY**

**17BTBTOE01**

**BIOREACTORDESIGN**

**L T P C 3 0 03**

### **Course Objectives**

- To impart basic knowledge in bioprocess Engineering
- To design the bioreactors for various operations.
- To understand the principle and working of heat transfer equipments.
- To extend the knowledge in principle of heat transfer inside a bioreactor
- To construct the equipments used in mass transfer operations.
- To learn the equipments used in separation process.

### **Course Outcomes**

- Summarize the basic concepts in bioprocess Engineering.
- Ability to design the bioreactors for various operations.
- Ability to develop the heat transfer equipments for Bioprocess Engineering.
- Ability to construct the equipments used in mass transfer operations.
- To acquire the knowledge of regulatory constraints in bioprocess
- Categorize the equipments used in separation process.

### **UNIT I                      ENGINEERING PROPERTIES ANDSTORAGETANK                      9**

Introduction to various mechanical properties of material to be used material of construction, design of cylindrical storage tank.

### **UNIT II                      REACTORDESIGN                      9**

Design of Airlift fermentor, Bubble column reactor and Continuous stirred tank reactor.

### **UNIT III                      HEATTRANSFEREQUIPMENTS                      9**

Design of Shell and tube Heat exchanger, Double pipe heat exchanger, long tube vertical evaporator and forced circulation evaporator.

### **UNIT IV                      MASSTRANSFEREQUIPMENTS                      9**

Design of Bollmann extractor, fractionating column, packed tower and spray tray absorber

### **UNIT V                      SEPARATIONEQUIPMENTS                      9**

Design of plate and frame filter press, leaf filter, rotary drum filter, disc bowl centrifuge, rotart drum drier and Swenson –walker crystallizer.

**TOTAL: 45 HOURS**

**TEXT BOOKS**

S.NO	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	James Edwin Bailey, David F.Ollis	Biochemical Engineering Fundamentals	McGraw- Hill	2007
2	Don W. Green, Robert H. Perry	Chemical Engineer Hand book	The McGraw- Hill Companies,	2008

**REFERENCES**

S.No	Author(s) Name	Title of the book	Publisher	Year of Publications
1	Pauline. M. Doran	Bioprocess Engineering Principles	Academic Press	2013

**Course Objectives**

- To learn the scope and importance of food processing.
- To impart basic knowledge in different food processing methods carried out in the food tech companies.
- To extend the brief knowledge in food conservation operations.
- To study the methods of food preservation by cooling.
- To familiarize the students on the concepts of preservation methods for fruits.
- To create deeper understanding on preservation methods for vegetables.

**Course Outcomes**

- Describe the scope and importance of food processing.
- Outline the various processing methods for foods.
- Extend the knowledge in food conservation operations.
- Describe the methods of food preservation by cooling.
- Summarize the preservation methods for fruits.
- Demonstrate the preservation methods for vegetables.

**UNIT I SCOPE AND IMPORTANCE OF FOOD PROCESSING****9**

Properties of food- Physical, thermal, mechanical, sensory. Raw material Preparation - Cleaning, sorting, grading, peeling.

**UNIT II PROCESSING METHODS****9**

Heating- Blanching and Pasteurization. Freezing- Dehydration- canning- additives- fermentation- extrusion cooking- hydrostatic pressure cooking- dielectric heating- micro wave processing and aseptic processing – Infra red radiation processing- Concepts and equipment used.

**UNIT III FOOD CONVERSION OPERATIONS****9**

Size reduction- Fibrous foods, dry foods and liquid foods- Theory and equipments- membrane separation- filtration- equipment and application.

**UNIT IV FOOD PRESERVATION BY COOLING****9**

Refrigeration, Freezing-Theory, freezing time calculation, methods of freezing, freezing equipments, freeze drying, freeze concentration, thawing, effect of low temperature on food. Water activity, methods to control water activity.

## **UNITV      PRESERVATION METHODS FOR FRUITS AND VEGETABLES9**

Pre processing operations - preservation by reduction of water content: drying / dehydration and concentration – chemical preservation – preservation of vegetables by acidification, preservation with sugar - Heat preservation– Food irradiation- Combined preservation techniques.

**TOTAL: 45 HOURS**

### **TEXTBOOKS**

<b>S.NO</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATIONS</b>
1	R. Paul Singh, Dennis R.Heldman	Introduction to food engineering.	Academic Press	2001
2	P.Fellows.	Food Processing Technology, Principles and practice.	Wood head Publishing Ltd	2000
3	MirceaEnachescuDauthy	Fruit and Vegetable Processing	FAO agricultural services bulletin	1995

### **REFERENCES**

<b>S.NO</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATIONS</b>
1	M.A. Rao, Syed S.H. Rizvi, Ashim K.Datta	Engineering properties of foods	CRC Press	2005
2	B. Sivasankar	Food processing and preservation	PHI Learning Pvt. Ltd	2002

**Course Objectives**

- To understand the available tools and databases for performing research in bioinformatics.
- To expose students to sequence alignment tool in bioinformatics.
- To construct the phylogenetic trees for evolution.
- To get familiar with the 3D structure of protein and classification.
- To acquire basic knowledge in protein secondary structure prediction.
- To extend the brief knowledge in Micro array data analysis.

**Course Outcomes**

- Summarize the basic concepts and importance of Bioinformatics in various sectors.
- Demonstrate the sequence alignment tool in bioinformatics.
- Construct the phylogenetic trees for evolution.
- Analyze the three dimensional protein structure and classification using various tools.
- Illustrate the protein secondary structure prediction by comparative modeling.
- Extend the knowledge in micro array technology and applications of bioinformatics in various sectors.

**UNIT I OVERVIEW OF BIOINFORMATICS****9**

The scope of bioinformatics; bioinformatics & the internet; useful bioinformatics sites. Data acquisition: sequencing DNA, RNA & proteins; determination of protein structure; gene & protein expression data; protein interaction data. Databases – contents, structure & annotation: file formats; annotated sequence databases; miscellaneous databases.

**UNIT II RETRIEVAL OF BIOLOGICAL DATA****9**

Data retrieval with Entrez & DBGET/ LinkDB; data retrieval with SRS (sequence retrieval system). Searching sequence databases by sequence similarity criteria: sequence similarity searches; amino acid substitution matrices; database searches, FASTA & BLAST; sequence filters; iterative database searches & PSI-BLAST. Multiple-sequence alignment, gene & protein families: multiple-sequence alignment & family relationships; protein families & pattern databases; protein domain families.

**UNIT III PHYLOGENETICS****9**

Phylogenetics, cladistics & ontology; building phylogenetic trees; evolution of macromolecular sequences. Sequence annotation: principles of genome annotation; annotation tools & resources.

**UNIT IV STRUCTURAL BIOINFORMATICS****9**

Conceptual models of protein structure; the relationship of protein three-dimensional structure to protein function; the evolution of protein structure & function; obtaining, viewing & analyzing structural data; structural alignment; classification of proteins of known three-dimensional structure: CATH & SCOP; introduction to protein structure prediction; structure prediction by comparative modeling; secondary structure prediction; advanced protein structure prediction & prediction strategies.

**UNIT V MICROARRAY DATA ANALYSIS****9**

Microarray data, analysis methods; microarray data, tools & resources; sequence sampling & SAGE. Bioinformatics in pharmaceutical industry: informatics & drug discovery; pharma informatics resources. Basic principles of computing in bioinformatics: running computer software; computer operating systems; software downloading & installation; database management.

**TOTAL: 45 HOURS****TEXTBOOK**

S. NO.	AUTHOR (S)NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Dan E. Krane, Michael L. Rayme	Fundamental Concepts of Bioinformatics	Pearson education	2004
2	Andreas D. Baxevanis, B. F. Francis Ouellette	Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins	Wiley-Interscience	2004
3	David W. Mount	Sequence and Genome Analysis	Cold Spring Harbor Laboratory	2004
4	Jonathan Pevsner	Bioinformatics and Functional Genomics	Wiley-Liss	2003

**REFERENCE BOOKS**

S. NO.	AUTHOR (S)NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Michael J. Korenberg	Microarray Data Analysis: Methods and Applications	Springer Science & Business Media	2007



### Course Objectives

- To impart the skills in the field of nano biotechnology and its applications.
- To acquire knowledge in the nano particles and its significance in various fields.
- To extend the knowledge in types and application of nano particles in sensors.
- To define the concepts of biomaterials through molecular self assembly.
- To equip students with clinical applications of nano devices.
- To describe deeper understanding of the socio-economic issues in nanobiotechnology.

### Course Outcomes

- Develop skills in the field of nano biotechnology and its applications.
- Summarize the nanoparticles and its significance in various fields.
- Extend the knowledge in types and application of nano particles in sensors.
- Define the concepts of biomaterials through molecular self assembly.
- Outline the clinical applications of nano devices.
- Describe the socio-economic issues in nanobiotechnology.

### UNIT I INTRODUCTION

9

Introduction, Scope and Overview, Length scales , Importance of Nanoscale and Technology, History of Nanotechnology, Future of Nanotechnology: Nano Technology Revolution, Silicon based Technology, Benefits and challenges in Molecular manufacturing: The Molecular assembler concept, Controversies and confusions, Understanding advanced capabilities, Nanotechnology in Different, Fields: Nanobiotechnology, Materials, Medicine, Dental care.

### UNIT II NANOPARTICLES

9

Introduction, Types of Nanoparticles, Techniques to Synthesize Nanoparticles, Characterization of Nanoparticles, Applications, Toxic effects of Nanomaterials, Significance of Nanoparticles Nanofabrications- MEMS/NEMS, Atomic Force Microscopy, Self assembled monolayers/ Dip- pen Nanolithography, Soft Lithography, PDMS Molding, Nano Particles, Nano wires and Nanotubes.

### UNIT III APPLICATIONS

9

Nanomedicine, Nanobiocensor and Nanofluidics. Nanocrystals in biological detection, Electrochemical DNA sensors and Integrated Nanoliter systems. Nano-Biodevices and Systems. Fabrication of Novel Biomaterials through molecular self assembly- Small scale systems for in vivo drug delivery- Future nanomachine.

### UNIT IV NANOBIO TECHNOLOGY

9

Clinical applications of nanodevices. Artificial neurons. Real-time nanosensors- Applications in cancer biology. Nanomedicine. Synthetic retinyl chips based on bacteriorhodopsins. High throughput DNA sequencing with nanocarbon tubules. Nanosurgical devices.

### UNIT V ETHICAL ISSUES IN NANOTECHNOLOGY

9

Introduction, Socioeconomic Challenges, Ethical Issues in Nanotechnology: With Especial Reference to Nanomedicine, Nanomedicine Applied in Nonmedical Contexts, Social Issues Relating to

Nanomedicine. Social and Ethical Issues, Economic Impacts, Other Issues, Nanotechnology and Future Socio-economic challenges.

### TEXT BOOKS

S.NO	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Niemeyer, C.M. and Mirkin, C.A	Nanobiotechnology: Concepts, Applications and Perspectives	Wiley-VCH	2004
2	Goodsell, D.S.	Bionanotechnology	John Wiley and Sons, Inc	2004

### REFERENCE BOOKS

S.NO	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Shoseyov, O. and Levy, I	Nanobiotechnology: Bioinspired Devices and Materials of the Future	Human aPress	2007
2	Bhushan, B.	Springer Handbook of Nanotechnology	Springer-Verlag Berlin Heidelberg	2004
3	Freitas Jr R.A	Nanomedicine	Landes Biosciences	2004
4	Kohler, M. and Fritzsche, W.	Nanotechnology – An Introduction to Nanostructuring Techniques	Wiley-VCH	2004

# MECHANICAL ENGINEERING

**17BEMEOE01**  
**P C 3 0 03**

**COMPUTERAIDEDDESIGN**

**L T**

## Course Objective

1. To apply basic concepts to develop construction (drawing) techniques.
2. To ability to manipulate drawings through editing and plotting techniques.
3. To understand geometric construction and Produce template drawings.
4. To understand and demonstrate dimensioning concepts and techniques.
5. To understand Section and Auxiliary Views.
6. To become familiar with Solid Modelling concepts and techniques.

## Course Outcomes

Upon completion of the course, the students will be able to

1. Apply basic concepts to develop construction (drawing) techniques.
2. Ability to manipulate drawings through editing and plotting techniques.
3. Understand geometric construction and Produce template drawings.
4. Understand and demonstrate dimensioning concepts and techniques
5. Understand Section and Auxiliary Views
6. Become familiar with Solid Modelling concepts and techniques.

### UNIT I OVERVIEW OF CAD SYSTEMS

**9**

Conventional and computer aided design processes-advantages and disadvantages.Subsystems of CAD-CAD hardware and software, analytical and graphics packages, CAD workstations.Networking of CAD systems.

### UNIT II INTERACTIVE COMPUTER GRAPHICS AND GRAPHICS TRANSFORMATIONS

**9**

Generative, cognitive and image processing graphics.Static and dynamic data graphics. Transport of graphics data. Graphic standards. Generation of graphic primitives - display transformation in Two- and Three – Dimensional graphics concepts, Graphical input technique, Geometric transformations, Visual Realism, Computer animation, customizing graphics software.

### UNIT III GEOMETRIC MODELING

**9**

Wireframe, surface, NURBS and solid modeling-applications and advantages. Creating primitive solids, sweeping solids, boolean operations. Extracting entities from a solid.Filleting of edges of solids. Boundary representation (B-rep) Constructive Solid Geometry(CSG) and Analytical Solid Modeling(ASM)

### UNIT IV PARAMETRIC DESIGN AND OBJECT REPRESENTATION

**9**

Types of co-ordinate systems.Parametric design - definition and advantages.Parametric representation of analytic and synthetic curves.Parametric representation of surfaces and solids - manipulations.

### UNIT V PRODUCT DESIGN AND DEVELOPMENT

**9**

Automated 2D drafting - basics, mechanical assembly - bill of materials generation.Mass property calculations.

**TOTAL:45 HOURS**

## TEXT BOOKS

<b>S. NO.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	Vera B Anand	Computer Graphics and Geometric Modeling for Engineers	John Wiley & Sons, New York	2000
2	Radhakrishnan P and Subramanyan S	CAD/CAM/CIM	New Age International Pvt. Ltd	2004

### **REFERENCES**

<b>S. NO.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	Radhakrishnan P and Kothandaraman C P	Computer Graphics and Design	Dhanpat Rai & Sons, New Delhi	2002
2	Ibrahim Zeid	CAD/CAM Theory and Practice	McGraw Hill Inc., New York	2003
3	Barry Hawhes	The CAD/CAM Process	Pitman Publishing, London	1998
4	William M Newman and Robert Sproul	Principles of Interactive Computer Graphics	McGraw Hill Inc., New York	1994
5	Sadhu Singh	Computer-Aided Design and Manufacturing	Khanna Publishers, New Delhi	1998
6	Rao S S	Optimisation Techniques	Wiley Eastern, New Delhi	2003

### Course Objective

- To recognize and evaluate occupational safety and health hazards in the workplace.
- To determine appropriate hazard controls following the hierarchy of controls.
- To analyse the effects of workplace exposures, injuries and illnesses, fatalities.
- To prevent incidents using the hierarchy of controls, effective safety and health management systems and task-oriented training.
- To teach student the concept of Industrial Safety & provide useful practical knowledge for workplace safety.
- To prevent or mitigate harm or damage to people, property, or the environment.

### Course Outcome

At the end of the course, student will be able to

1. Recognize and evaluate occupational safety and health hazards in the workplace.
2. Determine appropriate hazard controls following the hierarchy of controls.
3. Analyse the effects of workplace exposures, injuries and illnesses, fatalities.
4. Prevent incidents using the hierarchy of controls, effective safety and health management systems and task-oriented training.
5. Understand the concept of Industrial Safety & provide useful practical knowledge for workplace safety.
6. Prevent or mitigate harm or damage to people, property, or the environment.

#### UNIT I INTRODUCTION TO LOGISTICS 9

Logistics - concepts, definitions and approaches, factors influencing logistics - Supply chain: basic tasks, definitions and approaches, influencing supply chain - a new corporate model.

#### UNIT II PHASES OF SUPPLY CHAIN 9

The new paradigm shift - The modular company - The network relations - Supply processes - Procurement processes - Distribution management.

#### UNIT III EVOLUTION OF SUPPLY CHAIN MODELS 9

Strategy and structure - Factors of supply chain - Manufacturing strategy stages - Supply chain progress - Model for competing through supply chain management - PLC grid, supply chain redesign - Linking supply chain with customer.

#### UNIT IV SUPPLY CHAIN ACTIVITIES 9

Structuring the SC, SC and new products, functional roles in SC - SC design framework - Collaborative product commerce (CPC).

The management task - Logistics organization - The logistics information systems - Topology of SC application - Product Data Management - Warehouse management system MRP- I, MRP - II, ERP,. - Case study, ERP Software's

**TOTAL:45 HOURS**

### TEXT BOOKS

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Shari.P.B and Lassen.T.S	Managing the global supply chain	Viva books, New Delhi	2000
2	Ayers.J.B	Hand book of supply chain management	The St. Lencie press	2000

### REFERENCES

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Nicolas.J.N	Competitive manufacturing management - continuous improvement, Lean production, customer focused quality	McGrawHill, New York	1998
2	Steudel.H.J and Desruelle.P	Manufacturing in the nineteen - How to become a mean, lean and world class competitor	Van No strand Reinhold, New York	1992

**Course Objective**

1. To generalized equations for mass, momentum and heat.
2. To understand the concepts of Reynolds and Gauss theorems.
3. To learn combined diffusive and convective transport.
4. To apply Film- and penetration models for mass and heat transfer.
5. To apply Stefan-Maxwells equations for multi-component diffusion.
6. To Solve the given set of equations either analytically or numerically.

**Course Outcomes**

Upon completion of this course, the students can be able to

1. Generalized equations for mass, momentum and heat.
2. Understand the concepts of Reynolds and Gauss theorems.
3. Learn combined diffusive and convective transport.
4. Apply Film- and penetration models for mass and heat transfer.
5. Apply Stefan-Maxwells equations for multi-component diffusion.
6. Solve the given set of equations either analytically or numerically.

**UNIT I INTRODUCTION AND BASIC CONCEPTS****9**

General overview of transport phenomena including various applications, Transport of momentum, heat and mass, Transport mechanism, Level of transport, Driving forces, Molecular transport (diffusion), convective transport (microscopic)

**UNIT II PROPERTIES, UNITS AND OTHER PHYSICAL PARAMETERS****9**

Unit systems, temperature, mole, concentration, pressure, Gas laws, laws of conservation, energy and heat units

**UNIT III MOMENTUM TRANSPORT****9**

Basic concepts in fluid mechanics, Force, unit and dimensions, pressure in fluid, head of fluid, Molecular transport for momentum, heat and mass transfer, Viscosity of fluids, Newton's law, Momentum transfer, Newtonian and non-Newtonian fluids, Fluid flow and Reynolds number, Overall mass balance, Control volume and Continuity equation, Overall energy balance, Bernoulli's equation, Overall momentum balance, Drag coefficient, Stokes law, Flow in packed beds, Flow in fluidized bed

**UNIT IV ENERGY TRANSPORT****9**

Basic concepts in heat transfer, Heat transfer mechanisms, Fourier's law of heat conduction, thermal conductivity, convective heat transfer coefficient, Conduction heat transfer - through flat slab/wall

and through hollow cylinder, Conduction through solids in series, Forced convection heat transfer inside pipes, Heat transfer outside various geometrics in forced convection, General discussion on natural convection heat transfer, Heat exchangers, General discussion on radiation heat transfer

## **UNIT V MASS TRANSPORT**

**9**

Basic concepts in mass transport, Some application examples, Modes of mass transfer, Molecular diffusion- Fick's law, Analogy between mass, heat and momentum transfer, Dispersion, Hydraulic or Darcy's flow in porous media, Chemical kinetics and activation energy, Film theory, Convective mass transfer, Liquid-solid mass transfer, Liquid-liquid mass transport, Gas-liquid mass transfer, Aeration and oxygen transport, Air stripping

**TOTAL: 45 HOURS**

## **REFERENCE**

<b>S. N O.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICA TION</b>
1	Geankoplis, C. J	Transport Processes and Separation Processes Principles	Prentice Hall	2003

## **WEBSITES**

1. <https://laulima.hawaii.edu/portal>



**Course Objective**

1. To describe the principles of the study of human movement.
2. To describe the range of factors that influence the initiation, production and control of human movement.
3. To identify the body's lever systems and their relationship to basic joint movement and classification.
4. To distinguish between biomechanical principles of kinetics and kinematics when applied to the analysis of human movement.
5. To explain joint and muscle function and the forces acting upon the human body during various sporting activities.
6. To relate the different body systems necessary for human movement to occur.

**Course Outcomes**

1. Describe the principles of the study of human movement.
2. Describe the range of factors that influence the initiation, production and control of human movement.
3. Identify the body's lever systems and their relationship to basic joint movement and classification.
4. Distinguish between biomechanical principles of kinetics and kinematics when applied to the analysis of human movement.
5. Explain joint and muscle function and the forces acting upon the human body during various sporting activities.
6. Relate the different body systems necessary for human movement to occur.

<b>UNIT I</b>	<b>INTRODUCTION</b>	<b>9</b>
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Biomechanics - Improving Performance – Applications - Preventing And Treating Injury - Qualitative And Quantitative Analysis - Scholarly Societies - Computer Searches – Biomechanical Knowledge versus Information - Kinds of Sources - Evaluating Sources

<b>UNIT II</b>	<b>KEY MECHANICAL CONCEPTS</b>	<b>9</b>
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Mechanics - Basic Units - Nine Fundamentals of Biomechanics - Principles and Laws - Nine Principles for Application of Biomechanics

<b>UNIT III</b>	<b>HUMAN ANATOMY AND SOME BASIC TERMINOLOGY</b>	<b>9</b>
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Gross (Whole-Body) Modeling - Position and Direction Terminology - Terminology for Common Movements - Skeletal Anatomy - Major Joints - Major Muscle Groups - Anthropometric Data

<b>UNIT IV</b>	<b>ANATOMICAL DESCRIPTION</b>	<b>9</b>
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Key Anatomical Concepts - Directional Terms - Joint Motions - Muscle Actions - Active and Passive Tension of Muscle - Limitations of Functional Anatomical Analysis - Mechanical Method of Muscle Action Analysis - The Need for Biomechanics to Understand Muscle Actions - Sports Medicine and Rehabilitation Applications

Tissue Loads - Response of Tissues To Forces - Biomechanics of The Passive Muscle–Tendon Unit - Biomechanics of Bone - Biomechanics of Ligaments - Three Mechanical Characteristics of Muscle - Stretch-Shortening Cycle (SSC) - Force–Time Principle - Neuromuscular Control

**TOTAL: 45 HOURS**

**REFERENCES**

<b>S. NO.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	Duane Knudson	Fundamentals of Biomechanics	Springer Science+ Business Media, LLC	2007
2	C. Ross Ethier Craig A. Simmons	Introductory Biomechanics	Cambridge University Press	2007

## **AUTOMOBILE ENGINEERING**

**17BEAEOE01**

**AUTOMOBILEENGINEERING**

**L T P C 3 0 0 3**

### **Course Objectives**

- To impart the knowledge on constructional details and principle of operation of various automobile components.
- To learn the function and working of various components in transmission and drive lines.
- To study the concept and working of steering and suspension systems in an automobile.
- To give the knowledge on wheels, tyres and brakes of automobiles.
- To provide the information on current and future trends in automobiles.
- Identify and explain the types of steering system.

### **Course Outcomes**

Upon successful completion of the course, the students should be able to

- Demonstrate the operating principles and constructional details of various automobile components.
- Explain the function and working of components in transmission and drive lines.
- Identify and explain the types of steering system.
- Identify and explain the types of suspension system.
- Classify and describe the types of wheels, tyres and brakes of automobiles.
- Discuss the current and future trends in the automobiles.

### **UNIT I ENGINE AND FUELFEED SYSTEMS**

**9**

Classification of Engine, construction and working of four stroke petrol and diesel engine, firing order and its significance. Carburettor working principle, requirements of an automotive carburettor, Petrol injection Systems (MPFI, TBI), Diesel fuel injection systems (CRDI)

### **UNIT II TRANSMISSION SYSTEMS**

**9**

Requirements of transmission system. Flywheel. Different types of clutches, principle, Construction, torque capacity and design aspects. **Course Objectives** of the gearbox - Determination of gear ratios for vehicles. Performance characteristics at different speeds. Different types of gearboxes - operation. Function of Propeller Shaft Construction details of multi drive axle vehicles. Different types of final drive. Differential principles. Constructional details of differential unit. Non-slip differential. Differential lock

**UNIT III SUSPENSION SYSTEM****9**

Need of suspension system - Types of suspension - Suspension springs - Constructional details and characteristics of leaf, coil and torsion bar springs - Independent suspension - Rubber suspension – Pneumatic suspension – Hydro Elastic suspension - Shock absorbers. Vibration and driving comfort.

**UNIT IV BRAKES****9**

Necessity of brake, stopping distance and time, brake efficiency, weight transfer, shoe brake and disc brake theory, Brake actuating systems - Mechanical, Hydraulic and Pneumatic. Parking and engine exhaust brakes. Power and power assisted brakes. Antilock Braking System(ABS).

**UNIT V ELECTRICAL SYSTEM****9**

Principle and construction of lead acid battery. Lighting system: details of head light and side light, LED lighting system, head light dazzling and preventive methods – Horn, wiper system and trafficator. Starting System and charging system.

**TOTAL: 45 HOURS****TEXT BOOKS**

SL.NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Young U.P and Griffiths L	Automotive Electrical Equipment	ELBS & New Press	1999
2.	Ganesan.V	Internal Combustion Engines	Tata McGraw-Hill Publishing Co., New Delhi	2003
3.	Dr.Kirpal Singh	Automobile Engineering	Standard Publisher	2011

**REFERENCES**

SL.NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Heldt .P.M	The Automotive Chassis	Literary Licensing,LLC	2012
2.	Crouse.W.H	Automobile Electrical Equipment, 3 <sup>rd</sup> Edition	McGraw-Hill Book Co., Inc., New York.	1986
3.	N.Newton, W. Steeds and T.K.Garrett	The Motor vehicle, 13th edition	SAE Inc	2001

### **Course Objectives**

- The objective of this course is to make the students to know and understand the constructional details, operating characteristics and design aspects of Two and Three wheelers.
- Construct the frames of two and three wheelers of different layouts.
- Demonstrate the constructional details and principle of operation of various engine components.
- Identify and explain the types of transmission systems.
- Identify and explain the types of steering and suspension systems.
- Classify and describe the types of wheels, tyres and brakes for two and three wheelers.

### **Course Outcomes**

Upon successful completion of the course, the students should be able to:

- Construct the frames of two and three wheelers of different layouts.
- Demonstrate the constructional details and principle of operation of various engine components.
- Identify and explain the types of transmission systems.
- Identify and explain the types of steering and suspension systems.
- Classify and describe the types of wheels, tyres and brakes for two and three wheelers.
- Explain the servicing of two and three wheelers.

### **UNIT I INTRODUCTION**

**9**

Classifications- design considerations –weight and dimension limitations – requirements stability problems, gyroscopic effect- pendulum effect of two and three wheelers.

### **UNIT II POWER UNITS, IGNITION SYSTEMS AND OTHER ELECTRICAL SYSTEMS**

**9**

2 stroke and 4 stroke SI engines and CI engines design criteria– design of cylinders, cylinder head, cooling fins, crank case, connecting rod and crank shaft. Carburettor types and design. Battery coil ignition, magneto ignition and electronic ignition. Lighting and other electrical system.

### **UNIT III CLUTCHES AND TRANSMISSION**

**9**

Types of clutches for 2 and 3 wheelers. Design of clutch system. Gears for two and three wheelers. Design of gear box and gear change mechanism. Belt, chain and shaft drive. Freewheeling devices, starting systems.

### **UNIT IV FRAMES, SUSPENSION, WHEELS AND TYRES**

**9**

Types of frames used for two wheelers and three wheelers. Wheel frames- construction design of frames for fatigue strength torsional stiffness and lateral stability. Front and rear forks. Springs for suspension, Dampers, constructional details of wheel and tyres.

**UNIT V THREE WHEELERS****9**

Auto rickshaws, different types, Pick-Ups and delivery type vehicle, frames and transmission for 3 wheelers wheel types, wheel attachment tyre types. Brakes and their operating mechanism.

**TOTAL: 45 HOURS****TEXT BOOKS:**

SL.NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Irving P.E.	Motor Cycle Engineering.	Temple Press Book, London.	1992
2.	Srinivasan.S.	Motor cycle, Scooter, Mobeds.	New century bookhouse.	1988

**REFERENCES:**

SL. NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Griffin.M.M	Motor cycles from inside and outside.	Prentice Hall Inc, NewJersey.	1978
2.	Bruce A. Johns, David D. Edmundson and Robert Scharff	Motorcycles: Fundamentals, Service, Repair	Goodheart-Willcox	1999

**T P C 3 0 0 3****Course Objectives**

- The objective of this course is to make the students to know and understand the maintenance and fault diagnosis of basic systems in Automobile.
- Describe and differentiate the types of maintenance.
- List the procedure for dismantling, servicing and assembling of engine components.
- Demonstrate the servicing of transmission and driveline components.
- Discuss the procedure for steering and suspension
- Discuss the procedure for wheel and brake maintenance.

**Course Outcomes**

Upon successful completion of the course, the students should be able to:

- Describe and differentiate the types of maintenance.
- List the procedure for dismantling, servicing and assembling of engine components.
- Demonstrate the servicing of transmission and driveline components.
- Discuss the procedure for steering and suspension
- Discuss the procedure for wheel and brake maintenance.
- Explain the fault diagnosis in the electrical and air conditioner systems.

**UNIT I                      MAINTENANCE OF RECORDS AND SCHEDULES                      9**

Importance of maintenance, preventive (scheduled) and breakdown (unscheduled) maintenance, requirements of maintenance, preparation of check lists, Inspection schedule, maintenance of records, log sheets and other forms, safety precautions in maintenance.

**UNIT II ENGINE MAINTENANCE                      9**

Dismantling of engine components and cleaning, cleaning methods, visual and dimensional inspections, minor and major reconditioning of various components, reconditioning methods, engine assembly, special tools used for maintenance overhauling, engine tune up.

**UNIT III CHASSIS MAINTENANCE                      9**

Mechanical and automobile clutch and gear box, servicing and maintenance, maintenance servicing of propeller shaft and differential system, Maintenance servicing of suspension systems. Brake systems, types and servicing techniques, Steering systems, overhauling and maintenance. Wheel alignment, computerized alignment and wheelbalancing.

**UNIT IV ELECTRICAL SYSTEM MAINTENANCE                      9**

Testing methods for checking electrical components, checking battery, starter motor, charging systems, DC generator and alternator, ignitions system, lighting systems, Fault diagnosis and maintenance of modern electronic controls, checking and servicing of dash board instruments.

**UNIT V MAINTENANCE OF FUEL SYSTEM, COOLING SYSTEMS,  
LUBRICATION SYSTEM AND VEHICLE BODY 9**

Servicing and maintenance of fuel system of different types of vehicles, calibration and tuning of engine for optimum fuel supply, Cooling systems, water pump, radiator, thermostat, anticorrosion and antifreeze additives, Lubrication maintenance, lubricating oil changing, greasing of parts, Vehicle body maintenance, minor and major repairs. Door locks and window glass actuating system maintenance.

**TOTAL: 45 HOURS**

**TEXT BOOKS**

SL.NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	John Doke	Fleet Management	McGraw Hill Co	1984
2.	James D Halderman	Advanced Engine Performance Diagnosis	Prentice Hall Publications	2011
3.	Service Manuals from Different Vehicle Manufacturers			



### **Course Objectives**

- To impart knowledge on trends in the vehicle power plants.
- To learn the various advanced driver assistance systems.
- To study the working of advanced suspension and braking systems in an automobile.
- To give information about motor vehicle emission and noise pollution control.
- To provide knowledge of the vehicle telematics.
- To give information about the noise control techniques

### **Course Outcomes**

Upon successful completion of the course, the students should be able to

- Distinguish and describe the various modern vehicle power plant systems.
- List and explain the various driver assistant mechanisms.
- Identify and describe the working of advanced suspension and braking systems.
- Apply the knowledge of motor vehicle emission and noise pollution control.
- Describe the noise control techniques
- Describe the vehicle telematics and its applications.

**UNIT I                      TRENDS IN POWERPLANTS                      9**  
Hybrid vehicles - Stratified charged / lean burn engines - Hydrogen engines - battery vehicles –  
Electric propulsion with cables - Magnetic track vehicles.

**UNIT II                      DRIVER ASSISTANCE SYSTEMS                      9**  
Collision Avoidance Systems, Adaptive cruise control, adaptive noise control, anti spin regulation,  
traction control systems, cylinder cut- off technology, ABS, Driver Drowsiness Detection system

**UNIT III                      SUSPENSION BRAKES AND SAFETY                      9**  
Air suspension - Closed loop suspension - antiskid braking system, Retarders, Regenerative braking  
safety cage - air bags - crash resistance - passenger comfort.

**UNIT IV                      NOISE & POLLUTION                      9**  
Reduction of noise - Internal & external pollution control through alternate fuels/power plants –  
Catalytic converters and filters for particulate emission.

**UNIT V                      TELEMATICS                      9**  
Global positioning systems, geographical information systems, navigation systems, automotive vision  
system, road recognition

**TOTAL: 45 HOURS**

## TEXT BOOKS

SL. NO	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	LjuboVlacic, Michael Saren and Fumio Harashima	Intelligent Vehicle Technologies	Butterworth-Heinemann publications, Oxford	2001
2.	Ronald K.Jurgen	Navigation and Intelligent Transportation Systems –Progress in Technology	Automotive Electronics Series,SAE, USA.	1998

## REFERENCES

SL. NO	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	William B Riddens	Understanding Automotive Electronics, 5 <sup>th</sup> Edition	Butterworth Heinemann Woburn.	1998
2.	Bechhold,	Understanding Automotive Electronics	SAE	1998
3.	Robert Bosch	Automotive HandBook, 5 <sup>th</sup> Edition	SAE	2000

# CIVIL ENGINEERING

17BECEO01

HOUSING, PLAN AND MANAGEMENT

L T P C 3 0 03

## COURSE OBJECTIVES

1. To examine the role and tasks of basic housing policies and building bye laws
2. Understand the process of integrated service delivery in the context of economic, social, environmental and institutional factors
3. Analyze the Innovative construction methods and Materials
4. Analyze city management strategies and strengthen the urban governance through a problem solving approach
5. To know the Importance of basic housing policies and building bye laws
6. To use Housing Programmes and Schemes

## COURSE OUTCOME

The students will be able to

1. Know the Importance of basic housing policies and building bye laws
2. Use Housing Programmes and Schemes
3. Plan and Design of Housing projects
4. Examine Innovative construction methods and Materials
5. Know Housing finance and loan approval procedures
6. Understand Construction as well as managing techniques

## UNIT I INTRODUCTION TO HOUSING

9

Definition of Basic Terms – House, Home, Household, Apartments, Multi storeyed Buildings, Special Buildings, **Course Objectives** and Strategies of National Housing Policies, Principle of Sustainable Housing, Housing Laws at State level, Bye-laws at Urban and Rural Local Bodies – levels - Development Control Regulations, Institutions for Housing at National, State and Local levels

## UNIT II HOUSING PROGRAMMES

9

Basic Concepts, Contents and Standards for Housing Programmes - Sites and Services, Neighbourhoods, Open Development Plots, Apartments, Rental Housing, Co-operative Housing, Slum Housing Programmes, Role of Public, Private and Non-Government Organisations.

**UNIT III PLANNING AND DESIGN OF HOUSING PROJECTS****9**

Formulation of Housing Projects – Site Analysis, Layout Design, Design of Housing Units (Design Problems)

**UNIT IV CONSTRUCTION TECHNIQUES AND COST-EFFECTIVE MATERIALS****9**

New Constructions Techniques – Cost Effective Modern Construction Materials, Building Centers – Concept, Functions and Performance Evaluation

**UNIT V HOUSING FINANCE AND PROJECT APPRAISAL****9**

Appraisal of Housing Projects – Housing Finance, Cost Recovery – Cash Flow Analysis, Subsidy and Cross Subsidy, Pricing of Housing Units, Rents, Recovery Pattern (Problems).

**TOTAL: 45 HOURS****TEXT BOOKS**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Meera Mehta and Dinesh Mehta	Metropolitan Housing Markets	Sage Publications Pvt. Ltd., New Delhi	2002
2	Francis Cherunilam and Odeyar D Heggade	Housing in India Communication	Himalaya Publishing House, Bombay.	2001

**REFERENCES**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	-	Development Control Rules for Chennai Metropolitan Area	CMA, Chennai	2002
2	-	UNCHS, National Experiences with Shelter Delivery for the Poorest Groups	UNCHS (Habitat), Nairobi	2000

**Course Objectives**

1. Defining and identifying of eng. services systems in buildings.
2. The role of eng. services systems in providing comfort and facilitating life of users of the building.
3. The basic principles of asset management in a building & facilities maintenance environment
4. Importance of Fire safety and its installation techniques
5. To Know the principle of Refrigeration and application
6. To Understand Electrical system and its selection criteria

**Course Outcome**

The students will be able to

1. Machineries involved in building construction
2. Understand Electrical system and its selection criteria
3. Use the Principles of illumination & design
4. Know the principle of Refrigeration and application
5. Importance of Fire safety and its installation techniques
6. Know the principle behind the installation of building services and to ensure safety in buildings

**UNIT I MACHINERIES****9**

Hot Water Boilers – Lifts and Escalators – Special features required for physically handicapped and elderly – Conveyors – Vibrators – Concrete mixers – DC/AC motors – Generators – Laboratory services – Gas, water, air and electricity

**UNIT II ELECTRICAL SYSTEMS IN BUILDINGS****9**

Basics of electricity – Single / Three phase supply – Protective devices in electrical installations – Earthing for safety – Types of earthing – ISI specifications – Types of wires, wiring systems and their choice – Planning electrical wiring for building – Main and distribution boards – Transformers and switch gears – Layout of substations

**UNIT III PRINCIPLES OF ILLUMINATION & DESIGN****9**

Visual tasks – Factors affecting visual tasks – Modern theory of light and colour – Synthesis of light – Additive and subtractive synthesis of colour – Luminous flux – Candela – Solid angle illumination – Utilisation factor – Depreciation factor – MSCP – MHCP – Laws of illumination – Classification of lighting – Artificial light sources – Spectral energy distribution – Luminous efficiency – Colour temperature – Colour rendering. Design of modern lighting – Lighting for stores, offices, schools, hospitals and house lighting. Elementary idea of special features required and minimum level of illumination required for physically handicapped and elderly in building types.

## **UNIT IV REFRIGERATION PRINCIPLES&APPLICATIONS**

**9**

Thermodynamics – Heat – Temperature, measurement transfer – Change of state – Sensible heat – Latent heat of fusion, evaporation, sublimation – saturation temperature – Super heated vapour – Subcooled liquid – Pressure temperature relationship for liquids – Refrigerants – Vapour compression cycle – Compressors – Evaporators – Refrigerant control devices – Electric motors – Starters – Air handling units – Cooling towers – Window type and packaged air-conditioners – Chilled water plant – Fan coil systems – Water piping – Cooling load – Air conditioning systems for different types of buildings – Protection against fire to be caused by A.C. Systems

## **UNIT V FIRE SAFETY INSTALLATION**

**9**

Causes of fire in buildings – Safety regulations – NBC – Planning considerations in buildings like non-combustible materials, construction, staircases and lift lobbies, fire escapes and A.C. systems. Special features required for physically handicapped and elderly in building types – Heat and smoke detectors – Fire alarm system, snorkel ladder – Fire lighting pump and water storage – Dry and wet risers – Automatic sprinklers

**TOTAL: 45 HOURS**

### **TEXT BOOKS**

<b>S. NO.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	E.R.Ambrose	Heat Pumps and Electric Heating	John and Wiley and Sons, Inc., New York	2002
2	-	Handbook for Building Engineers in Metric systems	NBC, New Delhi	2005

### **REFERENCES**

<b>S. NO.</b>	<b>AUTHOR(S) NAME</b>	<b>TITLE OF THE BOOK</b>	<b>PUBLISHER</b>	<b>YEAR OF PUBLICATION</b>
1	-	Philips Lighting in Architectural Design	McGraw-Hill, New York	2000
2	A.F.C. Sherratt	Air-conditioning and Energy Conservation	The Architectural Press, London	2005

**TPC3003****Course Objectives**

1. To enable the students for a successful career as water management professionals.
2. To create a potential among students in the area of irrigation management with specific enrichment to synthesis of data and their analysis.
3. To expose the students the need for an interdisciplinary approach in irrigation water management
4. To providing a platform to work in an interdisciplinary team.
5. To provide students an ability to understand the applications of mathematical and scientific concepts to analyse intricate technical, social and environmental problems in irrigation water management and finding solutions for them.
6. To promote student awareness for a life-long learning process and inculcate professional ethics and codes of professional practice in water management.

**Course Outcome**

At the end of this the students will be in a capacity to

1. Understand the concepts of soil-water-plant relationship as well as to expose them to the principles and practices of crop production.
2. Exposure to ground water, hydraulics of ground water related to drainage, drainage concepts, planning, design and management of drainage related irrigation system management
3. Understand the various principles of irrigation management and to analyse the different types of irrigation systems and their performances based on service oriented approach.
4. Gain insight on local and global perceptions and approaches to participatory water resource management
5. Learn from successes and failures in the context of both rural and urban communities of water management.
6. Exposure on the use of economic concepts in irrigation development and to impart knowledge on economic planning so as to enable viable allocation of resources in the irrigation sector.

**UNIT I IRRIGATION SYSTEM REQUIREMENTS****9**

Irrigation systems – Supply and demand of water – Cropping pattern – Crop rotation – Crop diversification – Estimation of total and peak crop water requirements – Effective and dependable rainfall – Irrigation efficiencies.

**UNIT II IRRIGATION SCHEDULING****9**

Time of irrigation – Critical stages of water need of crops – Criteria for scheduling irrigation – Frequency and interval of irrigation

**UNIT III MANAGEMENT****9**

Structural and non-structural strategies in water use and management – Conjunctive use of surface and ground waters – Quality of irrigation water.

**UNIT IV OPERATION****9**

Operational plans – Main canals, laterals and field channels – Water control and regulating structures – Performance indicators – Case study

**UNIT V INVOLVEMENT OF STAKE HOLDERS****9**

Farmer's participation in System operation – Water user's associations – Farmer councils – Changing paradigms on irrigation management – Participatory irrigation management

**TOTAL: 45 HOURS****TEXT BOOKS**

S. NO.	AUTHOR(S) NAME	LE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Dilip Kumar Majumdar	Irrigation Water Management – Principles and Practice	Prentice Hall of India Pvt. Ltd., New Delhi	2000
2	R.T. Gandhi, et. al.	Hand book on Irrigation Water Requirement	Water Management Division, Department of Agriculture, Ministry of Agriculture, New Delhi	-

**REFERENCES**

S. NO.	AUTHOR(S) NAME	LE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Maloney, C. and Raju, K.V	Managing Irrigation Together”, Practice and Policy in India	Stage Publication, New Delhi, India	2000
2	-	Hand Book on Irrigation System Operation Practices	Water Resources Management and Training Project, Technical report No. 33, CWC, New Delhi	2000



**OBJECTIVE**

- To give an experience in the implementation of new technology concepts which are applied in field of Advanced construction.
- To study different methods of construction to successfully achieve the structural design with recommended specifications.
- To involve the application of scientific and technological principles of planning, analysis, design and management to construction technology.
- To study of construction equipment's, and temporary works required to facilitate the construction process
- To provide a coherent development to the students for the courses in sector of Advanced construction technology.
- To present the new technology of civil Engineering and concepts related Advanced construction technology.

**Course Outcome**

1. Implementation of new technology concepts which are applied in field of Advanced construction.
2. Different methods of construction to successfully achieve the structural design with recommended specifications.
3. Application of scientific and technological principles of planning, analysis, design and management to construction technology.
4. Will gain the Knowledge of construction equipment's, and temporary works required to facilitate the construction process
5. Development to the students for the courses in sector of Advanced construction technology.
6. The new technology of civil Engineering and concepts related Advanced construction technology.

**UNIT-I MODERN CONSTRUCTION METHODS****9**

Open Excavation, Shafts and Tunnels- Preparation of foundation, Cofferdams, Caisson, Piled Foundation, Prestressed Concrete Construction, Pre-cast Concrete Construction.

**UNIT-II CONSTRUCTION METHODS FOR SPECIAL STRUCTURES****9**

Construction Methods For Bridges, Construction Methods for Roads, Construction Methods For Special Structures for Railways, Construction Methods for Dams, Construction Methods for Harbour, Construction Methods for River Works Pipelines

**UNIT-III MODERN CONSTRUCTION EQUIPMENTS-I****9**

Construction Equipment used for Earth Moving, Excavating, Drilling, Blasting, Tunneling and hoisting

**UNIT-IV      MODERN CONSTRUCTION EQUIPMENTS-II****9**

Construction Equipment used for Conveying, Hoisting, Dredging, Dewatering Systems, Paving and concreting Plant

**UNIT-V      PRINCIPLES AND PRACTICES OF TEMPORARY STRUCTURES****9**

Principles and Practices of Temporary structures, Shoring, and Strutting, Underpinning, Principles and Design of Formwork, Scaffolding, Operation and maintenance of construction equipments

**TOTAL: 45 HOURS****TEXT BOOKS**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Peurifoy, R. L., , Ledbetter, W.B	Construction Planning , Equipment and Methods	Mc Graw Hill Co	2000
2	Antill J.M	PWD, Civil Engineering Construction	Mc Graw Hill Book Co	2005

**REFERENCE**

S. NO.	AUTHOR(S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Varma.M	Construction Equipment and its Planning & Applications	, Metropolitan Book Co	2000
2	Nunnally.S.W	Construction Methods and Management	Prentice – Hall	2000
3	Ataev, S.S	Construction Technology	MIR , Pub	2000

**LIST OF OPEN ELECTIVES OFFERED BY  
ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT**

**17BEEEOE01**

**ELECTRICHYBRIDVEHICLE**

**L T P C 3 0 03**

**Course Objectives**

- To understand the basic concepts of electric hybrid vehicle.
- To gain the knowledge about electric propulsion unit.
- To gain the concept of Hybrid Electric Drive-Trains.
- To gain the different Energy Management Strategies.
- To study about the efficiency manipulation in drives
- To understand and gain the knowledge about various energy storage devices

**Course Outcomes:**

- Summarize the basic concepts in bioprocess Engineering.
- Explain the concept of Hybrid Electric Vehicles.
- Understand the concept of Hybrid Electric Drive-Trains.
- Identify the different Energy Management Strategies.
- Understand the concept of different Energy Storage devices.
- Analyze the different motor drives used in Hybrid Electric Vehicles.

**UNIT I INTRODUCTION**

**9**

History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies.

**UNIT II HYBRIDELECTRIC DRIVE-TRAINS**

**9**

Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

**UNIT III ELECTRICPROPULSION UNIT**

**9**

Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

**UNIT IV ENERGY STORAGE**

**9**

Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices.

**UNIT V ENERGYMANAGEMENT STRATEGIES****9**

Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies, implementation issues of energy management strategies.

**TOTAL: 45 HOURS****TEXT BOOK**

<b>S. No.</b>	<b>Author(s) Name</b>	<b>Title of the Book</b>	<b>Publisher</b>	<b>Year of Publication</b>
1	Iqbal Hussein	Electric and Hybrid Vehicles: Design Fundamentals	CRC Press – 2 <sup>nd</sup> edition	2010

**REFERENCES**

<b>S. No.</b>	<b>Author(s) Name</b>	<b>Title of the Book</b>	<b>Publisher</b>	<b>Year of Publication</b>
1	Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi	Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design	Standards media – 2 <sup>nd</sup> edition	2009
2	James Larminie, John Lowry	Electric Vehicle Technology Explained	Wiley – 2 <sup>nd</sup> edition	2012

## 17BEEEOE02 ENERGY MANAGEMENT AND ENERGY AUDITING L T P C 3 0 0 3

### Course Objectives:

- To gain the knowledge about energy management.
- To understand the basic concepts in economic analysis in energy management.
- To understand the basic principles of energy audit.
- To gain the knowledge about the basic concept of types of Energy Audit
- To gain and Evaluate the different energy efficient motors
- Understand the concept of Energy conservation.
- To study about the behaviour changes of PF requirement in motor currents

### Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand the concept of Energy Management.
- Analyze the different methods for economic analysis
- Knowledge about the basic concept of Energy Audit and types.
- Evaluate the different energy efficient motors
- Understand the concept of Energy conservation.
- Investigate the different methods to improve power factor.

### UNIT I ENERGY MANAGEMENT

9

Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting –Energy Auditor and Energy Manager – Eligibility, Qualification and functions - Questionnaire and check list for topmanagement.

### UNIT II ECONOMIC ASPECTS AND ANALYSIS

9

Economics analysis – Depreciation Methods, time value of money, rate of return, present worth method, replacement analysis, life cycle costing analysis - Calculation of simple payback method, net present worth method.

### UNIT III BASIC PRINCIPLES OF ENERGY AUDIT

9

Energy audit – definition, concept, type of audit, energy index, cost index, pie charts, Sankey diagrams, load profiles, Energy conservation schemes – Energy audit of industries – energy saving potential, energy audit of process industry, thermal power station, building energy audit.

### UNIT IV ENERGY EFFICIENT MOTORS

9

**Electric Motors:** Factors affecting efficiency - Energy efficient motors - constructional details, characteristics - voltage variation –over motoring – motor energy audit-

**Energy conservation:** Importance-energy saving measures in DG set-fans and blowers pumps- air conditioning system- energy efficient transformers.

## **UNIT V      POWER FACTOR IMPROVEMENT, LIGHTING AND ENERGY INSTRUMENTS**

**9**

Power factor - methods of improvement, location of capacitors, p.f with non linear loads, effect of harmonics on p.f,- p.f motor controllers –Energy efficient lighting system design and practice-lighting control– Measuring Instruments – wattmeter, data loggers, thermocouples, pyrometers, lux meters, tong testers, application ofPLCs.

**TOTAL: 45 HOURS**

### **TEXT BOOK**

<b>S. No.</b>	<b>Author(s) Name</b>	<b>Title of the Book</b>	<b>Publisher</b>	<b>Year of Publication</b>
1	Murphy W.R.and G.Mckay      Butter worth	Energy Management	Heinemann Publications	2007

### **REFERENCES**

<b>S. No.</b>	<b>Author(s) Name</b>	<b>Title of the Book</b>	<b>Publisher</b>	<b>Year of Publication</b>
1	John.C.Andreas	Energy Efficient Electric Motors	Marcel Dekker Inc Ltd – 3rd edition	2005
2	W.C.Turner      Steve Doty	Energy Management Handbook	(b) Lulu Enterprises, Inc. - 8th Edition Volume II	2013

**Course Objectives**

- To understand the basic principles of PLC systems.
- To gain the knowledge about data handling functions.
- To gain the knowledge of storage techniques in PLC
- To acquire the knowledge about how to handle the data and functions
- To study about flow charts of ladder and spray process system
- To understand the principles of PID.

**Course Outcome**

- At the end of the course the student will be able to understand the registers and functions in PLC and they are able to do the program.
- To acquire the knowledge of storage techniques in PLC
- Students know how to handle the data and functions
- Students known about advanced controller in PLC applications
- Students gather real time industrial application of PLC
- Students gathered and evaluate the flow charts of ladder and spray process system

**UNIT I INTRODUCTION 9**

PLC Basics PLC system, I/O modules and interfacing CPU processor programming equipment Programming formats, construction of PLC ladder diagrams, devices connected to I/O modules.

**UNIT II PLC PROGRAMMING 9**

PLC Programming input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill-press operation. Digital logic gates programming in the Boolean algebra system, conversion examples Ladder diagrams for process control Ladder diagrams and sequence listings, ladder diagram construction and flow chart for spray process system.

**UNIT III REGISTERS AND PLC FUNCTIONS 9**

PLC Registers: Characteristics of Registers module addressing holding registers input registers, output registers. PLC Functions Timer functions and industrial applications counters counter function industrial applications, Architecture functions, Number comparison functions, number conversion functions.

**UNIT IV DATA HANDLING FUNCTIONS 9**

Data handling functions: SKIP, Master control Relay Jump Move FIFO, FAL, ONS, CLR and Sweep functions and their applications. Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two axes and three axis Robots with PLC, Matrix functions.

**UNIT V PID PRINCIPLES 9**

Analog PLC operation: Analog modules and systems Analog signal processing multi bit data processing , analog output application examples, PID principles position indicator with PID control, PID modules, PID tuning, PID functions

**TOTAL: 45 HOURS**

**TEXT BOOKS**

<b>S. No.</b>	<b>Author(s) Name</b>	<b>Title of the Book</b>	<b>Publisher</b>	<b>Year of Publication</b>
1	JR Hackworth and F.D Hackworth – Jr	Programmable Logic Controllers – Programming Method and Applications	Pearson	2006

**REFERENCES**

<b>S. No.</b>	<b>Author(s) Name</b>	<b>Title of the Book</b>	<b>Publisher</b>	<b>Year of Publication</b>
1	John Webb and Ronald A Reiss	Programmable Logic Controllers – Principle and Applications	Fifth edition, PHI	2004
2	W.Bolton	Programmable Logic controller	Elsevier Newnes Publications, 5 <sup>th</sup> Edition	2009

**WEBSITE**

<http://www.mikroe.com/old/books/plcbook/chapter1/chapter1.htm,->  
Introduction to programmable Logic controller



**Course Objectives**

- To gain the knowledge about environmental aspects of energy utilization.
- To understand the basic principles of wind energy conversion, solar cells, photovoltaic conversion.
- To understand the basic principles fuel cell, Geo thermal power plants.
- To gain the knowledge about hydro energy.
- To study about solar energy collectors and its storages
- To study about the inter connected system in wind power

**Course Outcomes**

At the end of this course, students will demonstrate the ability to

- Analyze the Energy Scenario in india
- Understand the concept of Solar Energy
- Understand the concept of Wind Energy
- Understand the concept of Hydro Energy
- Analyze the different energy sources
- Students gathered the real time inter connected system modelling in wind power

**UNIT I INTRODUCTION****9**

Energy scenario - Different types of Renewable Energy Sources - Environmental aspects of energy utilization - Energy Conservation and Energy Efficiency - Needs and Advantages, Energy Conservation Act 2003.

**UNIT II SOLARENERGY****9**

Introduction to solar energy: solar radiation, availability, measurement and estimation– Solar thermal conversion devices and storage – solar cells and photovoltaic conversion – PV systems – MPPT. Applications of PV Systems – solar energy collectors and storage.

**UNIT III WINDENERGY****9**

Introduction – Basic principles of wind energy conversion- components of wind energy conversion system - site selection consideration – basic–Types of wind machines. Schemes for electric generation – generator control, load control, energy storage – applications of wind energy – Inter connectedsystems.

**UNIT IV HYDRO ENERGY****9**

Hydropower, classification of hydro power, Turbine selection, Ocean energy resources, ocean energy routes.Principles of ocean thermal energy conversion systems, ocean thermal power plants. Principles of ocean wave energy conversion and tidal energy conversion.

**UNIT V OTHERSOURCES****9**

Bio energy and types –Fuel cell, Geo-thermal power plants; Magneto-hydro-dynamic (MHD) energy conversion.

**TOTAL: 45 HOURS**

## TEXT BOOKS

S. No.	Author(s) Name	Title of the Book	Publisher	Year of Publication
1	Rai.G.D	Non-conventional sources of energy	Khanna publishers	2011
2	Khan.B.H	Non-Conventional Energy Resources	The McGraw Hills, Second edition	2009

## REFERENCES

S. No.	Author(s) Name	Title of the Book	Publisher	Year of Publication
1	Rao.S. &Parulekar	Energy Technology	Khanna publishers, Eleventh Reprint	2013
2	Godfrey Boyl	Renewable Energy: Power sustainable future	Oxford University Press, Third edition	2012
3	John W Twidell and Anthony D Weir	Renewable Energy Resources	Taylor and Francis – 3 <sup>rd</sup> edition	2015

## WEBSITES

1. [www.energycentral.com](http://www.energycentral.com)
2. [www.catelectricpowerinfo.com](http://www.catelectricpowerinfo.com)